ECHNOLOGY DEPARTMENT

approach

May 1959

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THE NAVAL AVIATION SAFETY REVIEW

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APR 28
DETROIT

WHAT IT FEELS LIKE

"... When my shoulders hit the slipstream, it pulled me out of the aircraft and my helmet and mask tore off ... it felt like someone had wadded up a little piece of paper and thrown it up in the air and hit it with a baseball bat ... I have never had such a terrific force and my eyeballs hurt ... I kept saying to myself, 'I am not going to lose consciousness' ..."

—Crewman after A3D bailout

approach for may 1959

Three to Go	3
Curb that Creep	11
Unsafe Indication, Request Gear Check	14
Forced Landing Techniques	16
Anymouse	18
Headmouse	22
Fools Rush In . . .	26
Whiz Quiz	29
Truth and Consequences	30
Notes from Your Flight Surgeon	34
Jet-Set	36
Think, then Trim	38
From the Ground Up	40
Murphy's Law	46

Credits:

Cover: Guest Artist LTJG Max Katz depicts his impression of potent summer thunderstorms. A graduate of the Philadelphia Museum School, LTJG Katz is now CinCLant Fleet Graphic Arts Officer.

Pages 24, 25: This excerpt, from a similar APPROACH feature of June 1957, appropriately highlights "Fools Rush In . . . ," major thunderstorm article by LT Roland Laro.

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it

bailout

Letters

Check & Double-Check

Sir:

Re: "Landing Clearance" in February APPROACH by CDR J. L. Holbrook! I disagree with the CDR's suggestions. I am not a pilot, but by having spent most of the past 12 years in Air Traffic Control, both with the military and CAA, and by having experience in both shipboard Pri-Fly and Airport Control Towers and in ARTCC I feel that I am qualified to speak up on the subject.

I agree that the system which CDR Holbrook suggested works fine on board ship where the LSO all but actually flies the aircraft onto the deck, and there is no other type traffic involved. But on a shore installation where you have a mixture of aircraft taking off, landing, GCA, Range and TACAN low passes, and touch-and-go's all on the same or crossing runways combined with the vehicular traffic crossing the runway, and add to this, as you stated in the editor's comments about not being able to see all of the runway from the approach end, this system just would not work.

As I see it, the best solution available is not in the tower or on the runway with the wheel watch, but rather in the aircraft. The surest system, therefore, is for the pilot to put the gear down, and then double or even triple check if necessary, to assure that the gear is indicating DOWN and LOCKED.

THOMAS H. ELZEY
Airways Operations Specialist
Control Tower
NAS, Memphis, Tenn.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by the U.S. Naval Aviation Safety Center.

Altimeter Visibility

Sir:

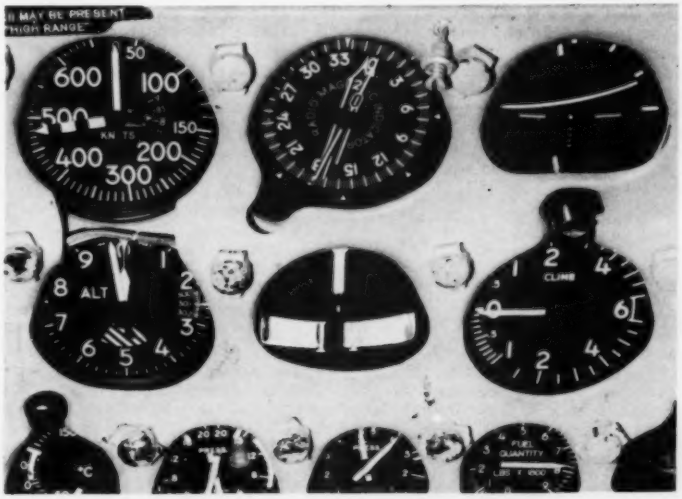
The comparison between the pictures on pages 36, 37 and 38 of the January APPROACH reveals a serious defect from the human engineering standpoint insofar as the readability of the altimeter is concerned.

The outer index of the 10,000-foot needle is the primary means of reading the indicated altitude, yet in the top picture on page 38, which is the view the pilot has of the instrument in the F9F-8P, the outer portion of this needle is not visible from about the 25,000-foot indication to the sea level, or zero-foot position. This would appear to increase the possibility of the altimeter being misread at altitudes below 25,000 feet, which are certainly the most critical.

This squadron is operating F9F-8Ps and F3D-2Qs. To improve the visibility of the altimeter in the latter, it was necessary to cut away a segment of the instrument light shield in order for the pilot to see the altimeter properly. (See photo.)

It is considered that this problem of making all aircraft instruments plainly visible and readable should be a simple engineering feat, and should be accomplished in all the aircraft in service, as well as those on the drawing boards.

R. R. READ
LtCol USMC, CO, MCRS-3



Note effect of modified cut-out for altimeter, left, as compared to cut-out for climb indicator, right.

Wants Gun Stock

Sir:

Might it not be possible to supply for the current Navy pilot's side arm, the .38 Special S&W Military and Police revolver, a shoulder stock, made of fiberglass or a similar light plastic, capable of being affixed to the butt of the side arm and being incorporated into the construction of its holster as in several other side arms such as the German Luger and Mauser pistols, the Belgian Browning pistol, and

Please turn page

Continued from preceding page

some early models of the single action Colt's revolver?

Such an arrangement, with other possible changes such as a longer barrel and better sighting equipment, may provide us a better "survival weapon" without adding noticeable bulk or weight to the trappings of a single-place aircraft's pilot.

LTJG J. S. STOCKARD
FASRON 10

● This, like numerous other suggestions, is a good one if you disregard the other problems that are introduced by adopting it. A longer barrel would be clumsier in many situations—including wearing it. Let's face it, when you come up against something so big or so far away that a S&W .38 pistol won't do the job, a rifle stock isn't going to contribute very much, is it? Keep in mind that you're a survivor, not a conqueror, and practice using that handy, compact handgun with your other arm as a support. Your sincere suggestion is appreciated but we don't hold much hope for it.

FOD Prevention Hopeful

Sir:

Your February issue revealed that APPROACH is still on the team of Foreign Object Damage (FOD) prevention to jet engines. Over the last few years, your articles on this subject have been most beneficial in establishing local FOD prevention programs.

We hereby commend the appropriate members of your M&M Department . . .

Your February articles substantiate other available data, including past records at this station, that the majority of FOD to jet engines is caused by carelessness during servicing and maintenance of aircraft vice objects being sucked up from the deck as once supposed.

During this calendar year, this squadron will receive approximately sixty-four J65 and J57 engines which will require complete repair, and which have been rejected due to FOD.

Perhaps we can't expect FOD prevention to completely eliminate our job (i.e. repair/replacement of compressors and compressor components), but surely it is not overanticipating to await the day when it has been reduced by at least 50%.

Keep up the good work.

V. C. SLEDGE, ADC
Fasron NINE, NAS Cecil Field

First HUK Ditching

Sir:

Thought you'd be interested in LCDR Claude Whittle's report of ditching a HUK-1; this is a first:

We were launched, to return passenger to the USS JALLAO and return to the TARAWA for plane guard. The return of the passenger was accomplished and the flight back to the TARAWA commenced.

The wind was from the north at 18 knots. The sea had swells of four feet from about 330 degrees. The water temperature was 60° outside air temperature was 44°.

The flight back to the TARAWA placed the wind about 40 degrees on the starboard bow of the HUK. Our altitude was about 150 feet and the airspeed was about 65 knots. When we were about halfway back to the ship the engine quit cold, no warning.

The crewman was sitting on the edge of the center seat at the time, preparing the aircraft for plane guard duty. He was wearing the gunner's belt with the safety lock in place. Both side doors were closed.

The aircraft autorotated very well and there was always adequate control. At the time of contact with the water the ground speed was negligible in a slight tail-low position. Two jolts were felt on contact with the water. There was no tendency for the HUK to cartwheel or do any other unusual maneuver. It gently rolled to the left as the crewmen went out the left after experiencing a little difficulty releasing the safety lock on his belt. The top of the cabin pushed the crewman slightly under the water, but there was no injury and he popped back to the surface immediately.

The contact with the water and the roll to the left placed me in the position of having to open the starboard door to exit. One pull on the red "T" handle completely released the door and a push removed it. I then released my safety belt and pulled the bottles on the life vest. The plane continued settling rapidly and a minute later the only things left floating were the rescue sling and very small pieces of the rotor blades.

We were rescued by helicopters from the TARAWA.

C. J. BURTON
CO, HU-2

Low Level Lanyard

Sir:

Could you go into a little more detail about the NASC stand on the use of a lanyard to aid the low altitude escape possibility in *today's* airplanes?

Your comment that the Air Force system for by-passing the 3-second delay in the automatic chute opener applies in that they tie it into the lap belt which we do not have in the F8U.

I have information from CVA that there is an ASC which will remedy this with a seat snubber when the wing is up but this doesn't help us now.

What about rigging a lanyard with one end fixed to the seat and the other end to a snap which could be hooked to the D-ring for landing, MLP and CarQual work? Then when the pilot and seat separate the chute would be opened manually without waiting for the 3-second delay.

It appears this would give us a chance, at least, following a flameout at low altitudes and low airspeeds with the present seat.

The airspeed at which the lanyard would be hooked on would be well below the maximum for safe chute deployment, and the risk of fouling seat and chute appear a lot less than betting on the 3-second delay or depending on the pilot to find and pull the D-ring.

V. R. HANCOCK, LT, USN
VF(DAY) Safety Officer

● Please see "Shoot Seat Development," Headmouse of Jan '59 Approach. F8U ejection seat snubber line (ASC 131) is now URGENT category.

Shanghaied & Returned

Sir:

Please transfer Shelton and Garner back to Leeward Point from Cherry Point. (Wheels-up Saves February 1959 Issue) . . .

E. F. BLEAKNEY, ACC
Leeward Point

• For the record we hereby return your air controlmen.

It was night and the landing gear of the A3D refused to come down. The carrier radioed the crew their instructions. They chose to bail out—there were

Please turn page

THREE TO GO!

THREE TO GO!

IN THE bright moonlight, the calm sea shone like a silver mirror. The cloudless summer night was stirred only by a gentle wind and the sound of the engines of the A3D-2. After completion of a practice bombing mission, the aircraft had been diverted from a carrier landing because the starboard main gear could not be lowered.

Below them, the crew could see the lights of a town, then the dark shape of an island.

"You guys heard the ship's instructions," the pilot said to the bombardier-navigator and the third crewman. "We take our choice—everybody bails out . . . or you two bail out and I land on the divert field on the island with all gear up or with all gear down except the starboard. You can bail out or stay with it for a landing. Al?"

"I'll bail out," the third crewman replied.

"Bill?"

"Bail out," answered the bombardier-navigator.

"Al, what would you suggest — a landing with two gear-down or a wheels-up landing?"

"If it was me, sir, I'd land with wheels up. And you got to remember those empty fuel tanks can explode."

The pilot's three spaced radio calls to the divert airfield tower had brought no answer. He pointed out a flashing red light in the distance.

"That red beacon is the airfield. We're at 13,000', 160 knots, all gear and flaps up. Prepare for bailout. Make that red light your goal. Bill, fire the escape chute."

The bombardier-navigator pulled the emergency escape chute D-ring and the escape chute opened.

The pilot's fourth radio call to the tower raised an answer. He told the tower the situation and notified them that two crewmen would be bailing out over the field. Would it be possible to land the A3D on the strip with gear up or with all gear down except one? The tower's reply was, "Wait."

The third crewman moved into position to jump. He pulled the visor of his helmet down and tightened the chin strap. The bombardier-navigator checked the rake up. Upon a signal from the pilot, he hit the third crewman on the shoulders to bail out. He had to hit him on the shoulder a second time before the third crewman realized this was the signal to go. As the third crewman went down the escape chute, the bombardier-navigator moved into position and in a matter of seconds followed him.

After the two men had jumped, the pilot began a shallow, wide turn to the right and rapidly reviewed his situation.

" . . . A landing on a foreign field . . How much crash equipment do they have and how good is it? They won't have foam on the runway . . . and no arresting gear. My fuel gage is unreliable—the reading stayed the same when I cycled it . . . I could have a flameout from fuel starvation while I'm making the ap-

proach . . . Haven't had any transmission from the tower since they said 'Wait' . . . The field is a single strip. If I block it for any length of time it could cause the loss of some other aircraft up now . . . maybe even from the ship . . . I'm going to jump."

The pilot took a heading of 160 degrees down the peninsula and placed the auto-pilot on. He disconnected his oxygen hose, radio cord and lap belt. Pushing the shoulder straps clear, he took his kneepad off and put it on the bombardier-navigator's seat; then he stood up.

As he faced aft, he tightened all his parachute harness adjustments and his helmet chin strap and placed his oxygen hose beneath his parachute chest strap. He considered discarding his flashlight which was on a cord around his neck, then decided to keep it in case he needed it on the deck. He adjusted the auto-pilot to a slight nose-down position. Just north of the airstrip at 160 knots, 12,000′ altitude, five minutes after the bombardier-navigator had bailed out, he slid down the chute . . .

The aircraft continued on automatic pilot until it ran out of fuel 95 miles south of the island and crashed into the sea.

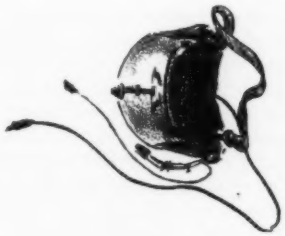
As an endorser on the AAR on this case states, conditions for bailing out were near ideal. Weather conditions and the speed and altitude of the aircraft were extremely favorable for the bailout, and the men had adequate time to prepare themselves for the jump.

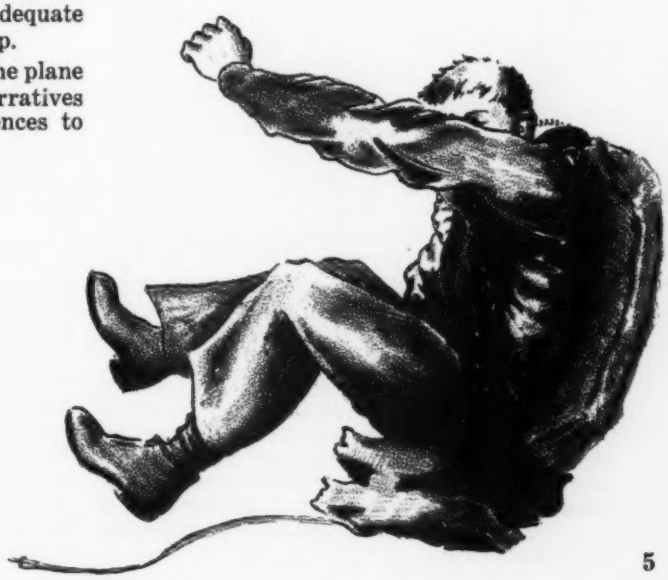
What happened to them as they left the plane and afterward? Here are their own narratives in which they described their experiences to the accident investigation board:

Bombardier-Navigator's Narrative:

"I checked helmet, parachute harness and mae west. On the pilot's command I fired the escape chute door down. The third crewman moved to position to jump. At this point I disconnected and sat on the edge of my seat facing the pilot. I checked the rake up and upon signal from the pilot I hit the third crewman's shoulders. I repeated this once more and began to move into position behind the third crewman when he left the aircraft. I put my right hand around the D-ring strap with my left arm holding my right elbow. Realizing at this time that we were over water, I jumped without further delay. I went out feet first with my body straight and head turned aside—I don't believe I touched the escape chute.

"My first realization after leaving the aircraft was that my left arm was extended above my head. I then released the D-ring strap and pulled the D-ring with a sliding motion. At some time either when leaving the plane or opening my chute, I lost my helmet. I saw my chute open fully and felt a sudden shock. My thighs hurt and my ears and the nape of my neck burned, but I felt a wave of elation and well-being. This feeling was so great that I had to make a conscious effort to convince myself that I couldn't just ride down. Checking my position, I saw that I was moving further out to sea and that the oscillation that followed the parachute opening had ceased. I





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pulled the risers with no results that I could see so I quit fooling with the lines.

"Three times I tried to get into a sitting position by hooking my thumbs in the straps and bringing my knees up. After these unsuccessful attempts I was very tired and thought that I had better save my energy. Next I tried to loosen my leg straps but could not because of my weight upon them. It seemed as though my entire weight was supported by my legs. Finally after I took my gloves off, I was able to release my leg straps. When I released the first leg strap I found myself nearly hanging by one leg and oscillating. I loosened the strap and refastened it. I had to kick the strap so that I could recover it on the swing. I used the same method to loosen the other strap. Then I attached my raft to my vest and attempted to operate the raft snap release; however, I couldn't reach it so I disconnected the raft line and held it in my hand.

"About this time I checked my position and altitude. I was close to the water, a hundred feet, I thought. I put my hands on the leg release and the next instant I was under water. The suddenness and how deep I went surprised me. I had been in an oscillation on striking the water and the shroud lines and chute went over my head. The canopy was clear but the lines were over my shoulders. Near panic, I began to fight the harness. I had to pause and calm myself before I thought to remove a pencil in my sleeve pocket and take one thing at a time. After removing the pencil I had little difficulty in sliding the shroud lines off my shoulders and surfacing. I was winded when I surfaced; I had no idea how long I had been under water. Once on the surface, I collapsed the chute and submerged and twisted out of my harness without incident. My right leg was caught but I easily kicked free.

"When I opened my life vest, little if anything happened. I feel that the vest supported me somewhat but I had to move my arms slowly to stay afloat. I tried again to pop the CO_2 cartridge with no results. Swimming away from the chute, I surveyed the situation. I couldn't see land to the east or any sign of a search. To the north I could see the lights of a town. My position was abeam the first group of lights to the east of the town.

"Rather than being glad to be alive, I was very dejected and felt all alone—I had been expecting this to happen as I had read of other cases. I assured myself that this was natural but it seemed to be almost too strong a feeling to be normal. Struggling to keep my head above water and throwing up the sea water I had already swallowed, I was close to panic.

"I became aware of my hurt ankle when I tried swimming. Frankly, I was worried. I had a strong urge to just give up. I thought about slipping out of my life vest and swimming for the shore I knew to be east of me. I knew that it would be suicide but the urge to get out of the water was almost overpowering. I calmed myself and thought of all the reasons I had to get home.

"I started swimming for the shore east of me. Shortly after I began swimming, I heard an aircraft. Swimming on my back, I sighted the plane and fired a flare. The aircraft didn't appear to see the flare. I let the flare burn out and then threw it away. Just after I dropped it, I realized that the daysmoke end was of value to me in the bright moonlight.

"I continued swimming and covered a good distance. I am an AAA swimmer and my vest was all but flat so I think that the tide and my swimming carried me at least four miles in that first hour. After swimming as far as I could and resting with a back stroke twice, I began to blow the whistle. Each time I rested I had blown more air in the vest and by now the vest would support me.

"While floating on my back after being sick again, I heard a whistle from the shore. I finished inflating my vest and began to blow my whistle and wave my light. Aircraft were flying low overhead so I fired my last flare at this time. After firing the flare, I fired the smoke signal in hope that it could be seen in the moon streak. The planes flew all around me and I thought I had been seen.

"I shouted toward the shore and blew my whistle. When I heard a very faint answering whistle I took heart and felt much better but continued to swim. The man on the shore built

a fire and kept on whistling. I was grateful for this encouragement.

"After another hour, I realized that I was drifting out to sea and when the fire disappeared I redoubled my swimming efforts. By now I was exhausted from swimming and from being sick five or six times. I felt that if I didn't get to the island I was lost.

"Even without a fire I could now see the shore. I kept swimming, alternating with a crawl and a float. I could only take six strokes without resting and I was winded constantly. Only the sight of the shore kept me swimming. I heard the sound of a boat in the water—then I saw a boat about 200 yards from me. I shouted, blew my whistle, waved my light and watched them go by.

"I resumed my swimming and whistle-blowing. Then I heard a different whistle much closer to me. I shouted asking if they were on the beach or in a boat. Receiving negative replies, I told them to go back because I didn't have a raft.

"They said not to worry, they would tow me in and asked me if I was hurt. I told them that my right ankle was sore but not broken. When the swimmers reached me, they told me that they were MPs and that the third crewman had sent them down the beach. They towed me in.

"When we reached the beach I looked at my watch for the first time and saw that it was 0015—3 hours and 20 minutes since I had bailed out.

"I was carried off the beach to a truck about a half-mile away. The truck got stuck in the sand and at this point I became very cold and tired. I don't remember anything clearly until I was drinking a cup of hot tea and talking to a doctor. Then my rescuers loaded me on a stretcher and took me to an ambulance where I joined my third crewman.

"For the first time I realized that it was all over and I was safe with only minor injuries."

* * * *

Crewman's Narrative:

"After the bombardier-navigator opened the escape chute, I sat at the top of the chute facing aft. I pulled my APH-5 helmet visor down and tightened the chin strap. My oxygen mask was unsnapped on the right side and snapped on the left side. At 2105 I bailed out.

"I pulled the D-ring four to five seconds later. When the chute opened, my APH-5 helmet and oxygen mask left my head and something hit me very hard in the right eye. I was over the water and tried to reach the strap to the life raft so I could hook it to my life vest. Although I could reach it, I could not unlatch the snap on the end of the webbing. I pulled the webbing out of the raft pack and tied it to my life vest.

"At this point I tried to get in a sitting position but no matter how hard I tried, I failed. The chute was oscillating badly. As I approached the ground, I guess the wind got hold of the chute and headed me toward the land. The chute was still oscillating when I hit the ground at about a 30-degree angle. The ground was very hard soil with rough rocks (one to two feet long) on the surface. The wind still had the chute open so I pulled the bottom lines and collapsed it. In a very few seconds I was clear of the chute. I untied the webbing from the life raft pack and began to look around.

"I was about 200 yards from the beach. I saw a red night flare and took a bearing on it with my compass. Walking on this heading, I arrived at the beach. I lit off a flare and blew my whistle. I could hear the bombardier-navigator whistling and hollering but I could not understand what he was saying.

"I gathered some wood and started a fire which I kept burning until help arrived. I stayed in contact with the bombardier-navigator all the time by blowing my whistle and he would whistle back.

"There were a lot of planes in the air but they were high. When one plane did fly over low, I tried to fire a flare but it failed to light.

"At about 2315 three MPs found me. I told them where I thought the bombardier-navigator was. Two of the MPs went up the beach to try and locate him and the other stayed with me. I was returned to the airfield and taken to the hospital. Later I learned the two MPs swam out about 250 yards and brought the bombardier-navigator in to the beach."

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Continued from preceding page

Pilot's Narrative:

"For the jump, I grasped the parachute D-ring and its pocket with my left hand. My right hand grasped the D-ring itself. I made a mental note to save the D-ring but lost it when I jerked it with such force that I threw it from me. To the best of my knowledge I did not touch the slide portion of the chute at all; I went out clean.

"Approximately five seconds after leaving the aircraft, I pulled the ripcord. Very shortly thereafter, there was a good solid, very welcome jolt as the chute opened. I unsnapped one side of my oxygen mask and took inventory of my equipment. I had lost only one thing, the goggles from my helmet. I loosened my left leg strap but was unable to loosen the right one.

"Considering the ground below, I chose the airstrip as my landing area but soon gave up trying to steer the chute as a slip in one direction was effective for only a few seconds and then the entire chute would rotate and my slip would be in a new direction. From the high altitude it was difficult to judge in which direction I was drifting.

"Looking up at the chute, I saw a dark section which I first thought was a tear but then decided was the pilot chute on top.

"At a lower altitude it became apparent that I was going to land in an area of trees about one mile north of the strip. In the dark I could not tell if these trees were 5 feet or 50 feet high. They turned out to be scrub ranging from five to 10 feet in height. I reconnected my oxygen mask to my helmet to provide protection from the branches, flexed my arms to limber them up for the landing, placed my feet together with the knees slightly bent and, after brushing one tiny tree branch, hit the ground. I tumbled one roll forward, then unsnapped my harness and got clear. The chute collapsed on landing.

"Considering the possibility of landmines, trip wires, charged fences, watchdogs and trigger-happy sentries—all later confirmed to be in existence around the field, I decided to walk in to the strip.

"I rolled my chute into a bundle which I carried in my left arm, slung the harness with seat pack over my right shoulder and started walking. This method of carrying the chute soon became difficult what with picking a way through the scrub so I put the harness on and carried the chute in both arms. I came upon one small wire strung at chin height which I carefully passed under.

"After walking approximately one mile, I came to a large high roll of barbed wire which paralleled the north boundary of the landing strip. I inspected the wire and its supports but could find no insulators so concluded it was not charged. In the not too far distance I could hear a number of dogs barking. Passage through the barbed wire would have required careful negotiation. It did not seem advisable to be hung up in the wire if patrol dogs should arrive. Weighing all factors, I chose not to attempt to cross.

"I waited approximately a half hour before a

patrol conducting a fence check in a truck with a searchlight came by and saw my waving flashlight. With wire cutters the patrol cut a path through the barbed wire so I could get to their truck.

"I was taken to the operations/control tower building and from there called a squadron plane orbiting above and reported my position."

* * * *

Communications Difficulties

The AAR noted two areas of communications deficiencies in this accident:

1) The pilot disconnected his radio several minutes before bailing out. His desire to provide a few minutes free of interruption while reaching a decision whether to bail out or attempt a landing is understandable, the AAR comments. However, this action deprived search and rescue facilities of the exact time and position of the bailout. An erroneous report from another source that the pilot was going to proceed to the carrier and bail out in that area further confused search and rescue.

2) The failure of the third crewman to jump

on the first signal resulted in a slight delay which subsequently caused the bombardier-navigator to land in the water. The misunderstanding arose when the pilot gave instructions on ICS at a time when the third crewman had disconnected his radio and was preparing for bailout. As soon as the third crewman understood he was to jump immediately, he left the aircraft without delay.

Effectiveness of Personal Equipment

Both the bombardier-navigator and the third crewman lost their APH-5 helmets and A-13-A oxygen masks during bailout or on opening chute shock. The bombardier-navigator tightened his chin strap over his oxygen mask before bailout but did not move the strap back under his chin. The third crewman's chin strap was fastened but his nape strap was somewhat loose.

Life Vest Doesn't Inflate

The bombardier-navigator's life vest inflated only partially when he pulled the toggles. In all probability, he loosened rather than tightened the cartridge caps prior to bailout and he lost the left cartridge cap while swimming. This ruined what little inflation the vest had received when the left CO_2 cartridge was fired. The right cartridge did not fire, either because the toggle was not pulled hard enough or because the cap on the container was too loose.

Pararaft Lanyards Not Secured

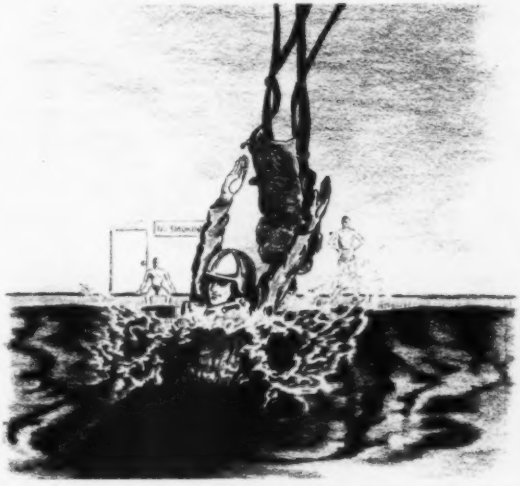
The crew habitually flew with their pararaft lanyards disconnected from their life vests in order to free themselves quickly from their parachutes in the event of a ditching. The bombardier-navigator bailed out and attached his raft to his life vest during descent. When he was unable to reach the snap release which secured the pararaft assembly in the pararaft container he disconnected the raft lanyard from his life vest and held it in his hand.

"Disconnecting the lanyard was most unwise," the reporting flight surgeon comments. "Retention of the raft after entering the water would have substantially altered subsequent events."

Value of Training

Among the AAR's recommendations is the following: "That as a part of every squadron survival training program, each crewmember be given at least one period of drill wherein he is attached to a parachute harness suspended from overhead and practices the action necessary to move himself back into the seat of the harness and the removal of the pararaft from under the seat."

This recommendation hits an area of great concern in naval aviation. Some carrier groups



have already taken measures to improve training in the use of parachutes. The training mock-up described below was designed with parachute procedures after ejection in mind. It can apply to free bailouts as well.

One carrier air group had four successful over-water ejections in a period of 40 days of deployment last year. All of the ejections were successful but two of the four men drowned and a third almost drowned because of parachute difficulties.

Conducts Hangar Deck Drill

Why should an otherwise successful ejection result in drowning? For the answer the air group conducted a hangar deck drill with these objectives in mind: 1) to determine if flying personnel are aware of the correct procedures prior to a water entry; 2) to determine if difficulties are encountered in carrying out these procedures; and 3) to give the pilots and air crewmen practice in the correct procedures.

Please turn page

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A standard parachute harness with a PK-2 pararaft kit was suspended from a beam on the carrier hangar deck. Each pilot or crewman stood on a box and was strapped in the harness in the usual manner. When the box was removed, he attempted to get back into the sling and then reach the pararaft container release. This drill was conducted in the presence of a flight surgeon, a survival officer and a qualified parachute rigger.

Results Are of Interest

The results of this drill are of interest to all naval aviation personnel. Of the 90 men 20 had some kind of difficulty getting back into the sling, many of them reaching a point near physical exhaustion. No matter how many times they tried, five of the men were never able to get into the sling and consequently either could not reach the pararaft container release or did so with great difficulty. Several of the men had erroneous concepts concerning proper procedures.

The physical characteristics causing the greatest difficulties in this group of 90 airmen were obesity, height greater than 6′2″, broad buttocks, short stocky build or a combination of these.

The very next day the hangar deck drill paid dividends. When one of the pilots made a successful ejection over water, he stated afterwards that the parachute harness drill had given him confidence in his ability to get free of his harness.

Parachute Training Is a Must

Supervised pilot training in correct parachute procedures before and after water landing is a must if we are to keep parachute difficulties in bailouts and ejections to a minimum.

A training mock-up of a complete parachute assembly—pararaft, seat cushion and oxygen bailout cylinder applicable to the type aircraft should be adopted by all squadrons. Training in simulated overwater descent procedures should be mandatory for all flight personnel in order for them to familiarize themselves thoroughly with the steps necessary for immediate release of the parachute on entry into the water and for retention of the pararaft.

Shore-based squadrons can go one step further and make these drills even more realistic by using the station swimming pool.

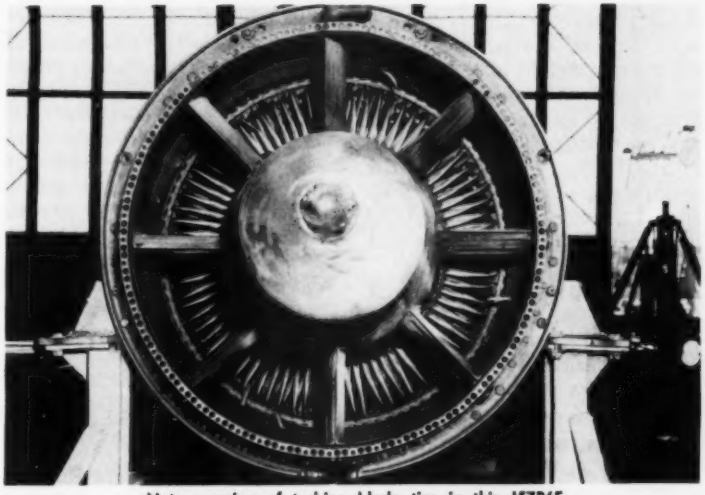
For a quick review of parachute techniques, see the NavAer *Survival Manual, NavAer-00-80T-52.*

Practice bailout drill should also be part of the training program of all squadrons flying aircraft permitting free bailout. For bailout drill purposes, one A3D squadron has constructed an extension to the bottom of the escape chute similar to a playground slide. A mattress at the end of the extension further protects the pilot or crewman from possible injury.

In those aircraft permitting free bailout, there is a standard bailout procedure set forth in the flight manual. Each squadron should set up its own bailout signals as part of its written doctrine. ●

CURB THAT CREEP!

THERE is a need for a clean-cut understanding of the intent of understanding of the intent of the time limits specified for Military and Maximum operating conditions. These 30- and 15-minute limits are established on the basis of the engine qualification tests which require these time limits during each cycle of the endurance runs. The limits have been carried over into the flight operating instructions as maximum time limits for these higher thrust ratings. The purpose of these time limits has been to discourage prolonged operation at the high thrust conditions in order to prolong engine life.



Note warping of turbine blade tips in this J57P6E engine—the result of abnormally high temperatures.

In order to obtain a better understanding of these time limits, an understanding of the factors reducing engine life when operating at high thrust conditions must be obtained. High engine rotor speeds increase centrifugal stresses in the compressor and turbine rotating parts (discs and blades). The temperature increases which accompany these high rotor speeds reduce the ability of the heat resistant alloys in the hot section to withstand high stresses.

This material distress with high temperatures is manifested in several different ways. The most important factor is that of *creep*. Creep is defined as the gradual elongation of metal over a period of time while subjected to very high temperatures. This creep is manifested by elongation of turbine blades, as well as buckling and warping of turbine nozzles and combustor liners. In the later stages of creep a turbine blade will rupture completely.

A second factor causing hot section distress which is primarily exhibited in the turbine blades is *stress-rupture*. Each heat resistant alloy has a finite time limit at which it can stand high stresses at specific temperatures prior to complete failure by rupture. This time period is inversely related to temperature (increasing temperature decreases time).

A third mechanism of failure is by fatigue. Fatigue failures can be caused by high frequency vibrations induced by interaction of stators and turbine blades or aerodynamic excitations from the hot gas flow. Fatigue failures can also result from variation of centrifugal and gas loads on turbine blades due to changing thrust conditions.

Another cause of weakening leading to failure is thermal shock stress. Thermal stresses are a result of significant changes of temperature throughout the hot section which cause the metal parts to contract and expand accordingly, as determined by their coefficients of expansion. Due to the non-symmetrical shapes and varying thicknesses throughout these parts, contractions and expansions are unequal, thereby setting up internal stresses. The material cracks and distorts in an attempt to relieve these stresses. Although these thermal stresses may not cause failure within themselves they will cause the parts to be weakened and also set up stress concentra-

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tions, thereby making a part more susceptible to failure by the other mechanisms.

For the causes noted above, excepting thermal shock stresses, time at a given temperature is the main factor in determining how long a part will last before it must be replaced or fail. Whether a part fails by creep, stress rupture or fatigue will depend on the design and operating environment of the part in the engine. As an example, J57 first stage turbine blades have the governing factor of creep, as the blades will stretch to a certain point. At this time they should be replaced because of the danger of rubbing the case and failing.

On the J33 Series 1 engines of the GMR-235, material turbine blade failures encountered have been by fatigue. The effects of time at high RPM and temperature on the remaining life of a hot section part are cumulative. It is somewhat irrelevant whether this high thrust time is put on the blade all in one period of running or stretched over a long period of service operation of the engine, during which the high thrust running is done in short intervals. Fatigue cracking and distortion caused by thermal stresses, on the other hand, is governed by the amount of starts and changes of thrust in operation of the engine.

In specific reply to the questions asked on the basis of the above considerations, the following is offered:

a. Does the maximum RPM limit of 30 minutes apply to an engine which, at full RPM, is indicating a TOT of only 580°C?

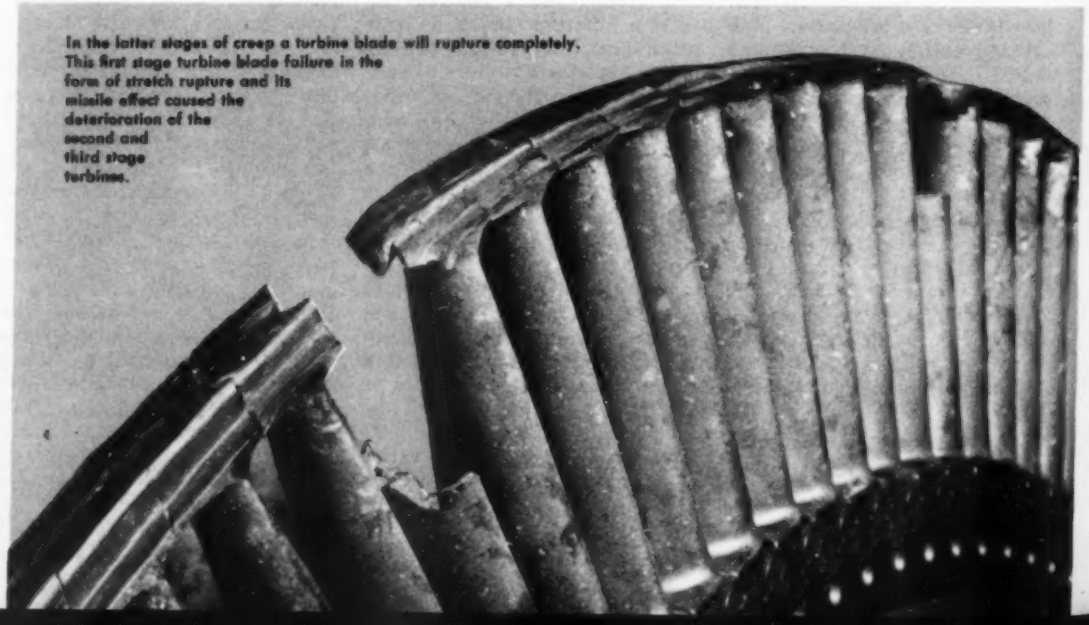
Answer: Research data (National Advisory Committee for Aeronautics) now show that a significant reduction in life of turbine parts is experienced when operating at Military RPM, even with no temperature increases involved, as compared to Normal RPM. Therefore, the 30-minute time limit must apply when either the full RPM or maximum allowable TOT only is reached.

b. To what RPM should the engine be throttled back after 30 minutes at full RPM?

Answer: The effects of time and temperature are cumulative and the hot section of the engine will have a given life at maximum allowable temperature operation whether this time is used up in one continuous period or in several intermittent periods. If the engine were to be throttled back after the 30-minute period at Military with the intent of boosting the engine back to full power again after a short time at the reduced thrust conditions, the main effect on the engine would be to subject the hot section parts to thermal stresses. Therefore, this action would be more harmful than helpful to engine life. The answer here is that if the mission absolutely necessitates operation at Military or Maximum conditions for longer than 30-minutes no action to reduce RPM for only a short period should be taken, as this will be of no help whatsoever in maintaining engine life. Therefore, operation should be continued at the Military RPM until the mission permits reduced thrust.

c. How long must the lower RPM be maintained prior to beginning another period at full RPM?

Answer: It is considered that this question has been answered by item (b). However, it is



In the latter stages of creep a turbine blade will rupture completely. This first stage turbine blade failure in the form of stretch rupture and its missile effect caused the deterioration of the second and third stage turbines.

desired to note here that engine life is roughly inversely proportional to the thrust conditions at which it operated. Research data show that a 100°F reduction in maximum operating temperature, coupled with the nominal reduction in RPM going with decreased thrust operation, may increase the life of turbine blades by a factor of 40 to 50 times. Therefore, for safety of flight and to realize maximum engine life prior to removal of the engine for hot section maintenance, pilots should be instructed to operate at the lowest thrust conditions compatible with mission requirements.

Important factors in jet engine hot section life are overtemperature and overspeed occurrences during starting (overtemperature only), accelerations and steady state operation. The excessive temperatures greatly accelerate metal deterioration due to the effects as noted earlier in this article, while overspeed conditions greatly increase centrifugal stresses. In addition, excessive temperatures may cause metallurgical changes in the alloys, thereby, greatly reducing their ability to withstand temperatures and stresses in future operation of the engine at high thrust conditions. Therefore, it is very important that all occurrences of RPMs and temperatures above prescribed limits encountered in starting and flight be noted and recorded.

The Air Force and Navy are now developing time-temperature instruments which will automatically record such factors as total operating time, military and Maximum time and extent and duration of overtemperature occurrences. When such devices become available for fleet aircraft, maintenance activities will have a much sounder basis for establishing engine overhaul intervals and determining when specific engines should have hot end components replaced or be sent to overhaul. These devices will also ease the pilot's burden of attempting to accurately note and record overtime and overtemperature occurrences.

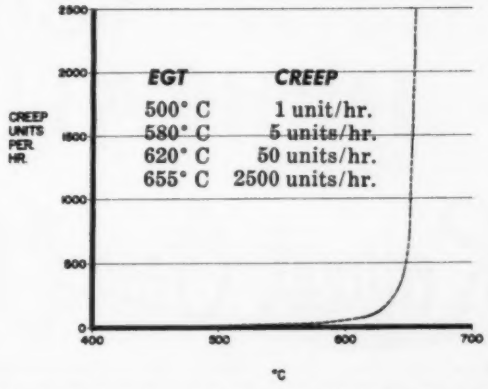
Material in this article is based on a BuAer letter clarifying RPM and temperature limitations. These involve a possible area of conflicting overlap in Military and Maximum operation direction of turbojet engines.

TURBINE TEMPERATURE TALK—Some of these new fighter aircraft are really cool! A pilot can do anything with them, if he knows his stuff. Like flying from ocean to ocean, continent to continent, and be ready to carry on from there. Yes, there's very little a good pilot can't do with these new fighters. . . .

. . . If the aircraft is in good condition, the pilot navigates it in the right direction and the engine gets enough fuel. Our concern here is aircraft condition, or to be more exact, engine condition, chiefly as it is affected by turbine inlet temperatures. If the engine is not asked to do the impossible it will get you there in good order—and bring you back, too.

WHAT is the impossible for a turbojet engine? We are not able to assign numbers to the impossible, but we do know that metals—turbine blades and discs, for example—expand and stretch as they turn at high RPM with very high centrifugal loads in the hot burning gases. This stretch is a permanent set and is called "creep" because it normally is very small over an engine's lifetime. We can assign numbers to relative "creeps" in a J57 engine (see chart).

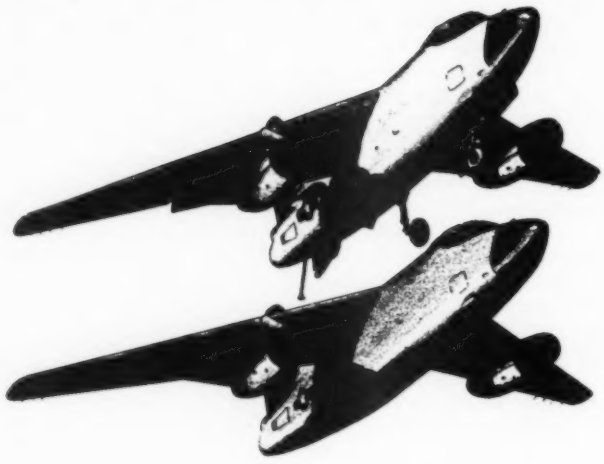
TURBINE life is directly proportional to the number of creep units the pilot gives it. From the above numbers we can see that the engine operated at the lower temperature will last 2500 times as long as it would at the highest temperature. Certainly, the engine will operate satisfactorily at the higher values, but it won't last as long.



YOU BET the new fighter aircraft are fast. But they are, after all, only machines, and machines give the best results when their limitations are known and are respected by the operators. Your flight manual will outline your engine's temperature limitations.

DON'T BE A VICTIM OF THE CREEPS!
KEEP YOUR TEMPERATURE DOWN.—

—Pratt & Whitney's "Turbine Temperature Talk" of October 1957



'.....UNSAFE INDICATION, Request Gear Check!'

SEVERAL mid-air collisions, and numerous near misses, in the past few years have been attributed to some strange attraction between two aircraft in close proximity. Many of these accidents and near accidents have occurred as one aircraft flew under another to check the upper aircraft's landing gear.

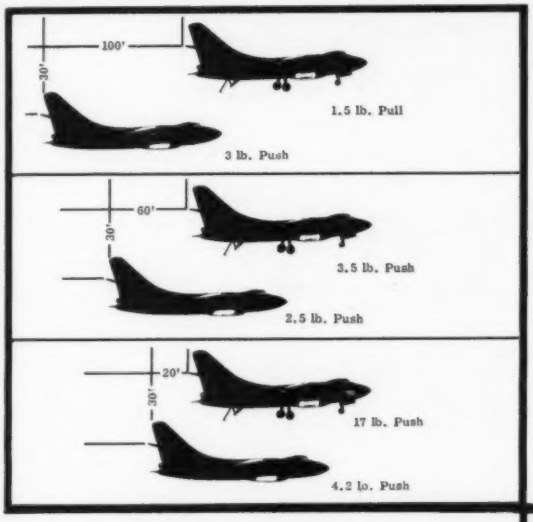
Anyone who has flown in formation will attest to the fact that aircraft in close formation flight disturb each other aerodynamically. Control force changes of various intensities come to be the expected thing if position is to be maintained. Terms such as "prop wash" and "jet wash" have become common through usage. However, the most significant interference between two aircraft is caused by wingwash; this involves about 10 times the momentum of engine wake in the flight conditions discussed here.

Estimates have been made of the interactions between two aircraft in formation. The sketches may not apply to all aircraft in exact distances or force representations, but should give some idea of the changes of stick force required if two aircraft are to maintain positions as shown. Of course, the greater the vertical separation, the less intense will be the force variations, or disturbances.

Stick forces required to compensate for interference are moderate until the lower aircraft is almost directly below the upper. As the lower aircraft moves still further ahead, an abrupt change in stick force is required of both aircraft in order to maintain position. The situation takes on other hazardous aspects when the problems of visibility are considered. As the lower aircraft moves under and ahead, his visibility is drastically reduced.

When aircraft are placed in close proximity to each other in this manner, any abrupt maneuvering, whether it is done to compensate for interference, or to increase clearance, is hazardous. For example, if the stick is pushed forward, the initial response of the aircraft is for the tail to rise. The Strategic Air Command, USAF, has published considerable material on this subject, which has been used in preparing this article. According to their magazine, *Combat Crew*, the magnitude of these reverse responses is surprisingly large; especially in large, heavy aircraft flying at slow speeds.

The stick forces and distances indicated in the sketches consider the case of one aircraft directly below the longitudinal axis of another. If the lower aircraft moves to the side, the problem is further complicated by the addition of interference in yaw and



roll, which may be of considerable magnitude. One of the most important things to note from the sketches is that the forces increase rapidly as vertical separation decreases. Therefore, should the pilot lag in his compensation, he may find the required corrections greatly increased over a very short period of time.

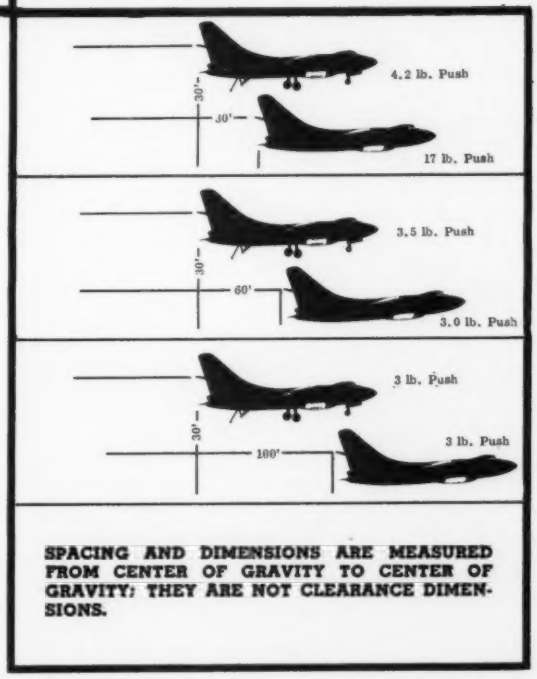
Wingwash interference effects generally increase with decreased airspeed. Also, the lowering of wing flaps further distorts the wing wake and adds to the interference. Thus we see that the hazards of extremely close formation flight are greatly augmented when at low airspeeds with flaps extended on the upper aircraft.

Slow flight in a landing configuration, and these are the conditions of flight under which a wheel check will be required, make a perfect set-up to be sucked-in by downwash. Air-to-air wheel and integrity checks are occasionally necessary; but the facts covered here should be borne in mind by both pilots involved.

√ Fly at as high an airspeed as permissible with gear down and flaps up. Do not fly too close to the upper aircraft; the object is simply to ascertain, not to repair the difficulty.

√ Normal formation flight is not unduly hazardous if the wingman maintains a position from which the lead aircraft is easily viewed and clearance is adequate.

√ If an overrunning situation is encountered, the wingman should break away by easing the nose down; avoid sliding under the leader and never attempt to maintain position directly beneath, or beneath and slightly ahead of the leader.



SPACING AND DIMENSIONS ARE MEASURED FROM CENTER OF GRAVITY TO CENTER OF GRAVITY; THEY ARE NOT CLEARANCE DIMENSIONS.

√ If extremely close formation is required, be prepared for control force changes and guard against abrupt control movements. ●

This article was written for civilian pilots, whose forced landing situation is of course, different from ours. However, when military pilots are committed to a crash landing, by unavoidable factors, these principles of energy absorption apply.

FORCED LANDING TECHNIQUES

By Jack Gaty
Mr. Jack Gaty is general manager for Beech Aircraft Corporation. This article first appeared in SAFETY SUGGESTIONS published by that company.

THE reliability of aircraft engines really is phenomenal. Many pilots fly single-engine airplanes over water and over extremely dangerous terrain without giving a second thought to the problem of a forced landing.

However, even four-engine aircraft have lost sufficient power to require their pilots to make an immediate landing. The reasons for these rather infrequent power failures are legion. There are many possible causes — including water in the fuel, bad maintenance, broken fuel lines, and dozens of other things — which can cause a sudden interruption of power, even in multi-engine aircraft.

There are a few pilots who have thought out a proper way to make a forced landing in the event that one does suddenly confront them. These pilots realize that the airplane in which they are flying is highly charged with kinetic energy of motion and that this energy of motion must be gradually absorbed in some way if they are not to suffer serious injuries themselves. In all accidents, the damage to the vehicle and the damage to the people in it are created by the sudden stoppage of the motion. If even a limited amount of distance is used to absorb the energy of motion the chances are good that the people in the vehicle will not be hurt.

Sacrifice Aircraft

The pilot must firmly establish in his mind the fact that it is a reasonable thing to sacrifice the airplane in order to save the people, whether or not the airplane is insured. If you live long enough, you can buy another airplane. Even the insurance companies agreed that they prefer to have the airplane sacrificed in an emergency during a forced landing than to have the people killed or injured. The insurance companies prefer to pay for the airplane rather than the people, for the simple reason that people are more expensive.

In forced landings, there are various ways to absorb energy. One is to put the airplane down with the wheels retracted on any body of water, even a small one. The water does not even have to be deep in order to function in this manner. The airplane cannot sink into the water more than a few inches before it slows down to the speed of a walk and it will slide on top of the water for only

a couple of hundred feet before slowing down to a walking speed. Another way is to put the airplane into bushes or little trees, such as saplings or small pine trees. In this case again, the wheels would be kept retracted. The small trees usually will bend over and act as a cushioning means for the airplane.

Another way is to select two trees 20 to 30 feet apart and get the airplane on the ground before it reaches the two trees and then let the two trees contact the wings to absorb the energy of the fuselage. Another way is to use one tree for the same purpose, and get the airplane on the ground before allowing the tip of one wing to contact the tree for the purpose of converting part of the energy of forward motion into energy of rotational motion. In other words, slow the airplane down by making it spin on its own center of gravity. This last method is subject to some hazard because of possible injuries and bruises to the occupants due to sudden change of direction of the airplane. It has worked when nothing else was available.

The major idea is to allow the energy of forward motion to be used up at a reasonably slow rate during a few seconds. If it is all dissipated in a fraction of a second, it is certain that all of the occupants will die.

The owner of a single-engine airplane has written us the details of the method by which he faced a forced landing in mountainous forested country, and was able to walk away from it. His own description of the forced landing follows:

"I left Altoona en route to Parkersburg, flying around Altoona territory for some 20 to 25 minutes and then proceeded on course, running the first 30 minutes out of the left gas tank and then switched to the right tank and ran to Parkersburg; near to Parkersburg airport, I switched back to the left tank and the motor ran for a full five minutes afterwards, which put me some 15 miles below Parkersburg airport."

(The fuel supply to the engine suddenly became interrupted and the engine stopped and could not be restarted, despite all possible efforts of the pilot.)

Use of Trees

"Then I started down in a glide holding 95 to 100 miles per hour so as to make sure that I would not stall out above the wooded terrain. I, of course, was working with the switching of tanks, wobble pump and everything I could think of in an attempt to start the motor but all efforts were in vain.

"When I saw that I was coming near tree tops and that it was going to be impossible to get the motor to run, I shut off all switches and prepared for the slowest landing possible, keeping in mind to have it on the tree tops when it quit flying. I picked a place where the wooded area was light for just a spot approximately 150 yards square, which was on the side of the hill where there were two trees that I felt I could get the nose between, catching the wings and breaking some of the impact. This is exactly what I did; however, when I got to within a couple hundred feet of the trees I saw I was going to overshoot, still maintaining 95 miles per hour, so I threw the plane into a skidding position and skidded down, leveling off at a point that I knew I could get the nose between the trees.

Fuel Line Breaks

"I leveled off and had it completely stalled out when I mushed it in, and it sat down in the underbrush exactly as intended, catching tips of the wings on each tree, uprooting one of the smaller trees and breaking the wing back on the left side, leaving it just slip by the tree and we sat down with little impact. The plane was on a side hill with the left wing higher, which had the fuel, and it appears that the breaking of the fuel line allowed the gas to run down over the exhaust, igniting same. There would not have been too much damage to the airplane had the fire not broken out.

"As requested in your letter, I wish to advise that both Mr. L_____ and myself were wearing the safety belts at the time of the accident.

"I would recommend to anyone to whom such an accident would happen to make sure the plane is kept flying until they get it down low enough and then all that is necessary is to go through the same procedure as a normal landing."

It is essential that the occupants be securely fastened to their respective seats to minimize the danger of striking parts of the airplane within the cabin on ground contact. Maximum protection will be afforded by the use of shoulder harness. Tight shoulder harness will prevent "Jack knifing" of the body on sudden impact and will restrain the upper torso from most sideward movement. Where shoulder harness is not available, the safety belt should be tightened as tight as possible, to insure retention of the occupant in the seat.

To lessen the danger of fire, the airplane electrical system and engine switches should be turned off prior to contact with trees, water, or ground.

The essential idea is to be certain that the airplane does not stop suddenly by crashing out of a stall or by running head-on into an obstruction.

ANYMOUSE plays BLIND MAN'S BUFF

IT was a dark, overcast night and the S2Fs were making night build-up carrier landings but for me it was my first experience with night CV work. On this particular mirror pass I landed somewhat to the left and caught number 4 wire.

Since I had landed so far to the left of the angle-deck centerline, the taxi director pointed me more to starboard than usual for a deck takeoff; however, at the time I didn't notice this. After a full-power turnup I got released for takeoff and shifted my gaze straight ahead at what I thought were the axial deck bow lights. Actually I was looking at lights marking the starboard deck edge just forward of the island.

We started our cross-deck takeoff roll with me concentrating on what I thought were the bow lights. Then the copilot, seeing the forward part of the island looming dead ahead, threw in full left rudder followed by left brake! Following a neck-wrenching swerve we flew off the deck somewhere between the island and the bow, just missing the island—or so I thought.

The next morning the skid marks on the deck were examined. They proved so interesting that another S2F was spotted in the same position. We found that the top of my starboard wing tip had contacted a pipe on the island. The underside of the pipe has a small smudge on it, matching the smudge on the top of our wing tip.

Thanks to the pilot with me the airplane didn't launch over the starboard side minus our right wing.

I strongly recommend that even though you are briefed prior to your initial night carrier flying, as I was, it pays to actually survey the deck lighting beforehand and get a good mental image of the lighting setup.

ROLLAID

THIS was one 4th of July weekend I almost didn't live to enjoy. On 3 July I was at the end of a normal scheduled hop with a destroyer on which I had been making simulated torpedo runs. I decided to give the boys on the bridge a thrill by making a 500 knot low-level pass in my supersonic *Cougar* and all went as planned until I passed abeam the ship. Suddenly I felt an overpowering urge to impress the boys a little more with a snappy aileron roll.

A roll to the left was begun; however my nose was not quite high enough and as I passed through the inverted position I noticed the nose falling through the horizon! Increasing the rate of roll to what seemed maximum for the bird, I came out in a wings level attitude with water lapping at the intakes.

At this time I proceed to home-plate still chewing at my parachute —a much shaken and a much wiser aviator. As most pilots agree, these urges which appear on the spur of the moment can be utterly disaster-

The purpose of Anymouse Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hairy or unsafe flight experiences. As the name indicates these reports need not be signed. Forms for writing Anymouse Reports and mailing envelopes are available in readyrooms and line shacks. All reports are considered for appropriate action.

— SUBMIT AN INCIDENT, PREVENT AN ACCIDENT —

ous. I consider myself fortunate to have the chance to perhaps become a senior LTJG one of these days.

SILENT SERVICE

WEATHER for a two-plane flight of FJ-3M's was given as CAVU all the way from Southern California to Texas with our fuel stop in west Texas reporting 1100 scattered. Both aircraft were "TACAN only" but it looked like an easy flight in which we would log a little night time.

Climb was normal and we leveled off at 42 thousand. Time passed and the TACAN became intermittent. The lead pilot attempted to contact GCI but I noticed he didn't answer any communications with ground stations or radio checks with me. Suspecting the trouble I moved in to a close wing position. Sure enough, "lead" signaled he had radio failure and passed the lead to me.

I contacted GCI and found my IFF sour. However we were located by skin paint and our course was fine. About 100 miles west of El Paso we started flying over a lower thin overcast. Item number two: El Paso TACAN was inoperative. In the snowballing fashion that seems to occur, the GCI station then lost me on their scopes.

By the time we estimated El Paso by DR we were over a very solid overcast and it was very dark. I called ELP radio for the latest destination weather. The freshest thing they had was two hours old and still carried 1100 scattered.

Proceeding on eastward I finally picked up the destination TACAN station about 100 miles out. By this time I was in contact with another GCI station. The position he gave me was close to the TACAN readings so I felt better but after talking with the destination I felt worse. They had 1100 scattered all right but only 2 miles visibility and no TACAN letdown.

I don't know how you would have felt in my position but I was concerned. Here I am at night, above an overcast with a wingman who has radio failure, on a VFR flight plan. The best alternate is El Paso with a high overcast and 10 miles but no TACAN. GCI says he can't give me flight following back to ELP as it is out of his range.

After a moment of awkward silence GCI asks why don't I try for Walker AFB, about 130 miles north of my present position. I asked for the weather and was told it was 18,000 overcast, 10 miles visibility, and he followed this information with the fact that I could get down on a RAPCON descent. This sounded good to me and being fresh out of ideas, I decided to go.

With bearings and distances coming in I began to feel much better. Then after some minutes I was shattered again; I was no longer in radar contact.

A substitute nav system consisted of GCI giving me short counts while I got bearings on the UHF ADF. This went on for what seemed an eternity. Finally I spied lights through a hole in the overcast; this was about 20 to 30 miles from Walker. My action was to pop dive brakes and go into a spiraling left turn down to 20 thousand feet and VFR conditions under the clouds. Coming around to heading I saw the lights of Walker, made

Continued from preceding page

contact with the tower and landed, a little older and much greyer.

Attached to this narrative was another: The thoughts of the other pilot on the flight. It commences as he (the leader) loses communications:

Now what's the matter with this silly radio. Oh well, might as well pass the lead. He's got a flight plan too . . . There's Tucson off to the south. We ought to be able to get Briggs TACAN pretty soon . . . He's easing north. Wonder why . . . guess he's playing it safe. No use getting down into Mexico.

Sure is black. A little moon would be mighty welcome . . . Hot Dawg! There's our field—15 degrees to the right and 150 miles. We ought to be getting past this undercast any time now . . . Sure wish we had a way of swapping the lead for a couple of minutes. He must not be getting the signal yet . . . Wait, there he goes. Good, I thought for a minute his TACAN might be completely out.

Now what *the devil is he doing?* 300 degrees! Oh, Oh—Our destination must be socked in . . . Think, boy, think! What's up this way . . . Cannon AFB is too far east. Can't be going there. Migawd! We can't be going to Albuquerque . . . I'm down to 1600 pounds . . . Might as well hang on — don't really have much choice.

Sure wish it was light enough to move out and look at the map . . . Well, he probably has something up his sleeve—I hope. Let's see . . . Kirtland is about 5200 feet up if I remember correctly . . . sure is going to be a long cold night if he drills around here and then lets go with the seat. I wonder if the seat leaves a red trail in the sky from the charge going off . . .

Oh! Oh! There we go! 85 percent and brakes out . . . Can't see anything down there. Wait! There's a town . . . can't be Albuquerque. Haven't been heading this way long enough.

Oh boy! There's a runway!

Wonder where we are? I know it's not Albuquerque . . . here we are at 5300 feet and still have lots of altitude. Not the right runway either . . . Wonder how long it is? Guess I'll take a little longer interval and see if he runs off the other end and blows up . . .

Man — there's nothing like the solid feel of runway beneath the rollers . . . Whatsat sign say . . . Walker AFB! Wonder where that is . . .

HOME BREW

HAVING read all the hairy tales of Anymouse since my designation as Naval Aviator I can no longer refrain from submitting one of my own favorite tales. In addition to the fact that it happened to me, I have often cited the experience as an example of DR flight planning and for the exercising of initiative should a pilot find himself pretty much on his own.

One September afternoon I departed an East Coast air station, bound for a military field on Long Island where I would RON. At that time I was a fledgling in a "big banjo" all-weather outfit and my thought was that the only way to get familiar with soup was to get into some (still one of my beliefs). Getting to the destination built up my confidence. It was IFR in stratus type clouds but I made a GCI/GCA and broke out at 2000 feet, satisfying indeed.

The next day was VFR but I planned and filed IFR to get home. More practice you understand; but it was at this time I discovered home base weather was 600 feet, lowering to 200 in +TRW with visibility varying accordingly from 2 miles to one-fourth mile. Aerology said I would enter stratus one-third of the way home, then with thunderstorms at the two-thirds point. The severity of the latter would increase sharply along the way.

Well, said I to myself, with an iron-jawed look at the weather map, had I not been up to my ears in the last few weeks flying GCA—practically to touchdown? Had I not proven to myself, on night and hooded hops, that I could DR to a predetermined position with the birddog off, turn it on when I thought I was there, and get a station passage.

Gaining confidence, I kept talking to myself. Had I not the utmost confidence in the airplane and its component parts, and in air traffic control? Was the heart not pure—and therefore had we not the strength of ten?

So leave us leap off into the blue!

The weather was exactly as forecast. At the one-third point I was in the stratus but it was at this time an unforecast occurrence dampened my enthusiasm—the low frequency radio was inoperative in all respects. The UHF transmission and reception system was only marginal with the UHF direction finder acting up.

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My dead reckoning nav was pretty good apparently as I was able to raise my reporting points only at the times previously calculated for station passage. At the spot where I should have started getting turbulence I got it: Turbulence like I never experienced before. 'Twas all I could do to hold the big *Banshee* straight and level.

About the time I figured the beer I was anticipating after landing was going to really have been earned, it was time to try for an en route descent to penetration altitude. By DR and a rough UHF homer indication I guesstimated station passage and anticipated an immediate penetration. It was not to be so. I was told to turn left to 090 and fly for two minutes. After complying I was instructed to turn left to 270. Having kept up with my navigation by means of time, heading and airspeed it didn't take too much of this, combined with the turbulence to get me disoriented.

It took several such steers, or orbits, before I could get courage up to ask what was going on. I was then told that thunderstorms activity in the vicinity of the penetration pattern was too severe to allow for radar coverage from GCA. However, I did get a descent to 12,000 feet on a heading of 090.

It soon became apparent that this particular F2H was not particularly watertight. A solid stream of water commenced flowing through the canopy seal into the cockpit. This was only the prelude though. Upon reaching 12 grand further instructions were requested and lo . . . none were forthcoming. It seems I had completely lost communications. So, with having to struggle with the stick to keep a reasonable flight attitude, with my legs sopping wet, and with the soup assuming a blackish hue, and with the fuel gage reading less than the bingo to the alternate, besides having no idea of my position, I, for the first time, commenced transmitting on Guard—to whomever would listen.

Apparently no one was, as I didn't hear a thing.

Although I felt, rather than computed, that as I had been on an easterly heading for so long, I must be a good way out over the water. I therefore had two alternatives; to take pot luck and eject over the water, or to try and bull my way down.

Wet as it was, with rain water still pouring in, the cockpit appeared the more secure of the choices.

I started a gentle turn to port and bent around to 270 degrees. Keeping in mind the 600 foot ceiling I turned on the radar altimeter and commenced to monitor this gadget quite closely as the altimeter wound through 3000 feet.

Happy day! I saw holes at 800 feet. At 500 feet I was in the clear. There was naught to be seen but ocean, however, and it was getting dark. With the gas gage moving to the "trouble" range I secured one engine and limped on westward.

Now, in the humorous way of communication gear, the home base low frequency range suddenly began coming in loud and clear. As luck would have it, I had just intercepted the northeast leg. Immediately I turned to track inbound and shortly after getting squared away on the range leg I was besieged with radio steers and other instructions from home base and a nearby GCI station. I acknowledged but was not about to leave my beam.

After about 10 minutes or so the coastline lights winked into view and, being more or less home, I lit off the other engine.

Later on that evening I reflected on just how palatable a beer can be at times.

headmouse

Teflon Hazards Explained

Dear Headmouse:

I want to tell you of the great concern we felt over an item in the August issue of APPROACH ("Teflon Hazard," page 48—Ed.) which quoted a BuAer dispatch indicating that "death can result from heating of 'Teflon' TFE fluorocarbon resin" . . . there have been *no permanent injuries or deaths* in the use of "Teflon" resins . . . "Teflon" is quite a safe material, it can be eaten in food, consumed in drink or worn close to the skin without danger . . . We believe most strongly that it is essential to correct these rumors whenever they gain currency. The importance of the material in our defense effort demands that we present the full facts on handling "Teflon" . . .

HAROLD G. BROWN, JR.
E. I. du Pont de Nemours
& Company Inc.

► *The substantiating data which you enclosed bears out the falsity of the rumor regarding a death due to Teflon. And there is no doubt that it is quite harmless in its inert form. However, the precautions which you included in your letter, and those which have been published by several aircraft manufacturers and by BuMed based on data provided by your firm, indicate that certain hazards do exist in connection with the handling of Teflon, and that certain precautions are necessary for personal safety. In seeking a complete answer to your letter, we were referred to an article which appeared in the 23 Jan 1959 issue of the BuMed "Medical News Letter," which is reprinted here.*

Teflon, because of its unusual engineering properties, has been used successfully and without health hazard in a wide variety of naval applications. This plastic combines a high degree of chemical resistance, dielectric strength, and thermal stability. As a result, valve packings, diaphragms, and electrical insulation are being fabricated from this plastic for use under circumstances where other materials could not be used.

Recently, some questions have been raised concerning the potential health hazard during operations with Teflon. The principal manufacturer of this plastic made an exhaustive survey of this subject. The following information summarizes the results of this survey and includes data obtained through 20 years of experience by the du Pont de Nemours Company, hundreds of processors and their employees, and thousands of end-item users handling this plastic daily:

1. Teflon should be regarded as an inert material. It can be eaten in food, consumed in drink, or worn close to the skin without danger. There have been no permanent injuries or deaths in the use of Teflon resins.

2. *Decomposition Products at Elevated Temperatures.* Some amplification may be desirable concerning the use of Teflon resins at higher temperatures. Under circumstances where other materials might well fail, a number of Teflon resins are designed to operate at temperatures over 400°F. While these Teflon items can and do retain their engineering properties indefinitely in such use, some minute proportions of decomposition products are evolved at a slow rate at 400°F. The rate of decomposition increases somewhat if the operating temperature is raised to 600° or 700°F. Routine use of mechanical ventilation is considered a sufficient precautionary measure. The following ventilation rates are recommended:

Product	Temperature	Ventilation Required cu ft/hr/lb of Teflon
Teflon 1, 5, or 7x	450°F.	7
	500°F.	30
	600°F.	70
	700°F.	600
Teflon 6, or 30	450 F.	30
	500 F.	80
	600 F.	600
	700 F.	4400

These air requirements represent the volume of air necessary to reduce the concentration of the gaseous pyrolysis product (from 1 pound of polymer) to 1 ppm by weight. The environment on long submergence time submarines presents a special case possibly requiring some adjustment of this limit and the accompanying air requirements. A separate study is being made of this case

Have a problem, or a question?

Send it to HEADMOUSE—he'll do his best to help.

and will be reported subsequently.

3. In the few cases reported where excessive amounts of these fumes have been inhaled accidentally, they have caused temporary symptoms similar to grippe. These symptoms do not appear until 2 to 6 hours after exposure and pass off within 36 to 48 hours.

In summary, the following information may be used as a general guide for personnel handling, machining, or heating Teflon:

1. During the machining of Teflon, dust may be generated. Use local mechanical ventilation to control this dust. The use of coolant is also recommended because it permits higher cutting or grinding rates and simultaneously keeps the dust concentration to a low level.

2. If Teflon resins are heated for extended periods in the 400° to 600°F. range, minute quantities of decomposition products are evolved. Therefore, adequate mechanical ventilation should be provided when working with Teflon at temperatures greater than 400°F.

3. Smoking should be prohibited in areas where Teflon is being fabricated in order to minimize the possibility of contaminating the pipe or cigaret with Teflon dust.

Our concern is not only for those who work with Teflon and know it, but for rescue, salvage and investigation personnel who may be exposed to decomposition products in the immediate vicinity of crashed or burning aircraft.

Very resp'y,
Headmouse

Autorotating

Dear Headmouse:

In reference to the Anymouse Tale "Hung Up" (Nov. 58 APPROACH), Headmouse commented that the standard procedure when loss of throttle control occurs in a helicopter is to cut the mixture and execute an autorotation. Not so in my squadron. An autorotation is the most exacting, difficult and hazardous of three methods since it makes a second try impossible and should be done only when neither of two other methods is prudent. At sea, an autorotation equals a ditching.

Our Flight Doctrine sets forth a full discussion. Briefly, the pilot should climb to a moderate altitude and determine the lowest airspeed at which he can maintain altitude, and also the rate of descent for various airspeeds. If the collective can be adjusted within engine and rotor RPM limits so as to come to a hover and land, (Similar to what "Hung Up" did), this method is best; otherwise, a run-on landing is in order.

In either event, the mixture shall be cut as soon as the aircraft is on the deck, maintaining some up-collective so as not to overspeed the engine before it stops (besides ruining a good engine, an overspeed in an HSS-1 is very conducive to ground resonance). These rules apply whether shore-based or carrier-based.

If the pilot misjudges in either of these two methods, he has enough leeway to take a waveoff and try again since he still has (or can regain) translational lift. An autorotation, on the other hand, is a one-shot affair: it has to be right the first time—or else log one accident.

N. H. McLAUGHLIN, LCDR
Aviation Safety Officer, HS-7

► We all will agree that a properly executed autorotation to the touchdown is a very exacting maneuver and does not allow very much room for error. If a practice autorotation is executed properly with a power recovery so that the craft is level in a hover at 10 feet above the ground, the same amount of training is gained and there is a lot more room for minor errors of misjudgment should they creep in.

The exponent of the practice autorotation to the touchdown say that this is a confidence builder for pilots. An autorotation with a power recovery is a confidence builder also, except the hazards of the very exacting touchdown are not present. In case an emergency should arise to a pilot who had all of his training in 10-foot leveloffs, the last 10 feet can be properly executed without incident. This fact is borne out by forced landing statistics and successful ditchings by pilots who have never made a full autorotation.

ONLY

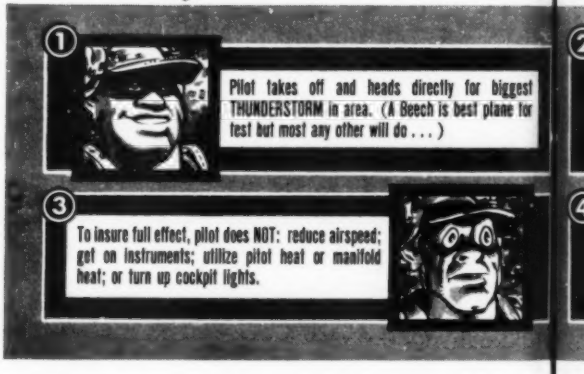
THUNDER

HAVE THE EXTRAORDINY
THAT MAKE THEM

from this

An actual result from an ELEMENTial as possible in black and white fr

***You** too, can make this ple*


1
Pilot takes off and heads directly for biggest THUNDERSTORM in area. (A Beech is best plane for test but most any other will do . . .)
3
To insure full effect, pilot does NOT: reduce airspeed; get on instruments; utilize pitot heat or manifold heat; or turn up cockpit lights.

CHECK THESE FEATURES:

- ✓ PROMPT RESULTS
- ✓ NATIONALLY RECOGNIZED
- ✓ ANTI-BODY-IC PUFFS

ACTUAL PHOTOGRAPH OF PILOT

BEFORE

TRYING OUR 10 MINUTE

Elemental TRIAL!!

Actual on-the-spot sketch by on-the-spot artist of on-the spot plane used in trial

USUALLY AVAILABLE ENROUTE DURING THE SUMMER

UNIVERSAL THUNDER

OF TH

OUR PRICE IS

(BUT THERE'S

ERSTORMS!

RDINY *Elemental* INGREDIENTS THEWHAT THEY ARE !!

ELEMENTrial is reproduced here as faithfully
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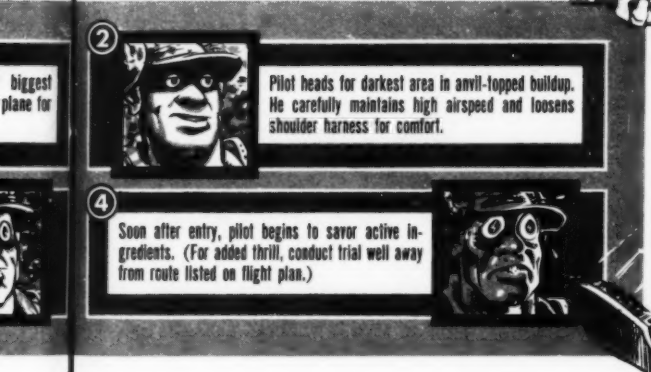

biggest plane for
2
Pilot heads for darkest area in anvil-topped buildup. He carefully maintains high airspeed and loosens shoulder harness for comfort.
4
Soon after entry, pilot begins to savor active ingredients. (For added thrill, conduct trial well away from route listed on flight plan.)

- TESTED BY AVIATORS
- TRUSTED BY NOBODY
- PROVED IN PSYCHIATRIC WARDS

ACTUAL PHOTOGRAPH OF PILOT

AFTER

OUR SENSATIONAL 10 MINUTE *Elemental* TRIAL!!

PRICE VARIES ACCORDING TO LOCAL BUILDUP

ORSTORM INSTITUTE

OF THE WORLD

OUR PROMISE BY GOD!!
THERE'S THE DEVIL TO PAY)

Actual photo of aircraft later . . .

Actual photo of aircraft later . . .

By

LT Roland Laro, USNR

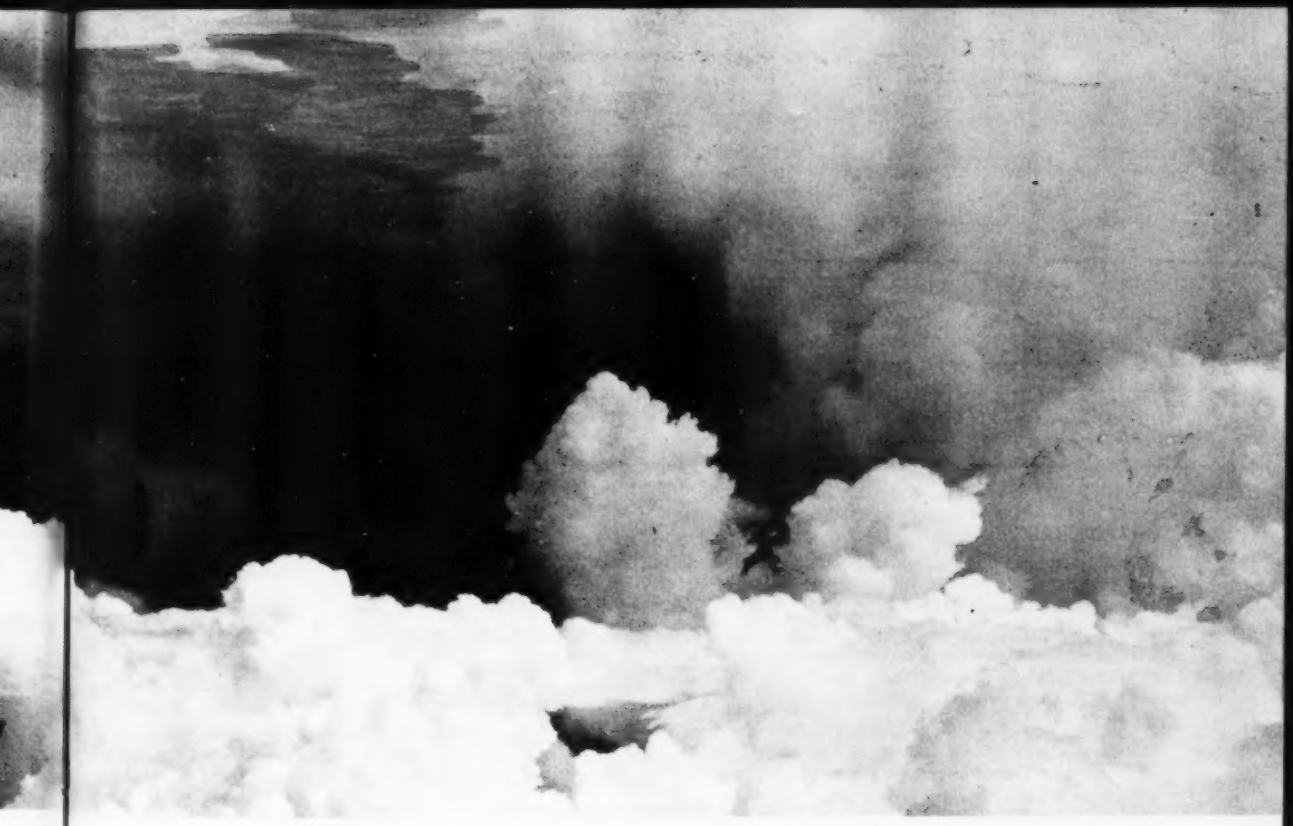
Meteorologist, U. S. Weather Bureau

. . . and sometimes wise men do, too. But the wise men go in with such preparations as appropriate airspeed, cockpit lights bright, pitot heat on, trailing antenna reeled in, and risk calculated.

With the month of May upon us, once again, we find ourselves faced with that "violently spectacular form of atmospheric convection" which we commonly call a thunderstorm. Most of you are familiar with the hazards and problems of flight in, over, under, or around thunderstorms, and surely there must be some few of you who are not. In either case, this is a good time to talk up tstms a bit *before* you find yourself in the middle of that big, whopping cumulonimbus wondering which end is up.

Severe turbulence, lightning, hail and rain all can be found in varying degrees in thunderstorms and usually are. One thing to remember for sure is to stay away if possible and if you can't, just have a lot of respect for those "rock and roll babies." Just don't go plunging through half-cocked or you may find yourself trying to push the panic button.

So what happens? One day you find yourself heading back to the base after some real ship tactics flight time. You can practically taste that martini and see *her* waiting at happy hour. Just about the time your imagi-



nation is getting carried away, a rude awakening . . . static in your earphones. Remember the weather briefing? Something about a front up ahead. Maybe you should start thinking about what you may run into (using the term loosely)! Thunderstorms? Maybe, anyway, if they are in a cold front you can see them quite easily since they're usually recognizable from any direction and are usually stretched out pretty much in a continuous line. Maybe it's a warm front you're supposed to go through . . . those warm frontal thunderstorms, they're the ones that give everyone trouble—you can't see them and all of a sudden the turbulence jars your upper plate loose.

If it is a warm front and you get showery precipitation in advance, you should have a pretty good idea that thunderstorms are in the area. You probably remember that weather lecture about pre-frontal or squall line thunderstorms. Those also can be rough ones. Even though they are easy to see they can just about be the roughest with tornadoes in some of the most violent squall lines. Also mentioned was something about orographic thunderstorms, something about forming in mountainous regions, difficult to see from the windward side but partly visible from the lee side. Usually they enshroud a mountain peak or hill. Wouldn't that be something if you tried to go under one of those—Gads . . .

What other kinds are there?—two more—convective and nocturnal thunderstorms. The convective types are due to the solar

Continued from preceding page

heating of the land or sea areas causing the warm air currents to rise. That's why these usually form over land areas during the late afternoon and dissipate at night when it cools. You don't have any worries about this type on your flight since you've had an overcast all day. Nocturnal thunderstorms? Well, they usually occur west of the Mississippi Valley Region and at night so no strain there.

What about the weather in those thunderstorms? Maybe this is getting serious! Lots of rain! turbulence! lightning and hail. Real crazy rain, maybe going up, suspended, or just falling. Anyway, the visibility probably will be lousy . . . Hail, the bigger the storm, the better chance of hail. Those stones can really be rough, and to really make matters worse, hail can be found in the precipitation, falling from the overhanging cloud or even several miles from the cloud itself. You've got enough to worry about without that . . . Lightning, too. No place actually to get away from it. Damage isn't too severe or serious if in an all-metal aircraft but those long thin extremities such as wing tips, the tail, radomes and propellers seem to be target areas.

The weather guesser also mentioned something about icing and turbulence. We-e-ell, that will have to be someplace near the freezing level and if you can stay away from that, you shouldn't run into too much icing. If you remember, and now is the time you should, he told you that the freezing level was also the zone of greatest turbulence and rainfall and to stay away from plus or minus a few thousand feet of the freezing level. Maybe by doing that, you can reduce some of these problems.

What are you going to do about the turbulence? Maybe you'll be lucky and not come into contact with any but the chances aren't too good. All sorts of updrafts and downdrafts, some gusts have been measured as high as 30 mph during penetrations. All sorts of reports mention those strong gusts occurring someplace between 14,000 ft. and 20,000 ft. so you'd better stay away from that altitude. He mentioned something also about updraft speeds varying from a few fps to as high as 100 fps while downdraft speeds being as strong as 40 fps . . . That's a lot of turbulence. Maybe if you're going to penetrate you should get prepared for severe turbulence.

How long will the thunderstorms last? Well, they're made up of three stages, the cumulus stage, mature stage and the anvil or dissipating stage. Most of these updrafts occur during the cumulus stage and the precipitation during the mature stage, including the hail. During the mature stage you also get the downdrafts. When you see an anvil type cloud or notice more downward currents, you usually will be in the dissipating stage. You think you're out of it? Not by a long shot, all this action takes place in cells varying from 1 to 5 miles in diameter with bases anywhere from 2000 ft. to 12,000 ft. with tops of well developed cells extending to 30,000 ft. to 50,000 ft.

To make matters worse, if possible, thunderstorms can be made up of several groups of these cells sometimes presenting a solid wall of clouds covering areas from approximately 20 square miles to more than 200 square miles. If you don't feel bad enough now, maybe you'd like to know that such cells are continuously forming and dissipating so that the life cycle of the thunderstorms will make you wonder at times if you'll ever get out of the woods.

Well have you had enough yet? Everything isn't really that black. Maybe you can, depending on the type of thunderstorm, circumnavigate, fly under, over, around or through. Your radar will help solve a lot of these problems. Maximum turbulence and drafts are generally in the regions of high water content and the area is delineated

An air mass thunderstorm of the type usually found in tropic areas. This type thunderstorm usually occurs in the late afternoon and evening, dissipates after sunset.

The mature stage of a thunderstorm, shown here, occurs before the well known anvil, or dissipating stage, shown on pages 26 and 27. But throughout a thunderstorm's entire life history it has plenty of oomph—so it's usually best to go around, go over, under,—or back. Radar can help you avoid the areas of heaviest precipitation.

by the radar echo. The light parts of the echo indicate the presence of lesser amounts of liquid water so the wise thing for you to do is to fly the areas indicated by the light or weak spots on the radar to avoid the most severe turbulence. From the 'scope, you can determine the cloud position, size and orientations and if you run into a squall line, you can pick a route taking you through the line in the least time and result in encountering the least turbulence.

You say you don't have a radar and all you can see is precipitation under the bases? We-e-ell, just about this time, you should do a one-eighty and forget happy hour and the willowy blonde for another week. Might just as well play it clean and stay away from all problems. ●

WHIZ QUIZ

1. In the northern hemisphere, is it preferable to go around a thunderstorm to the RIGHT, or to the LEFT?

2. Orographic thunderstorms occur mostly over open sea. TRUE or FALSE?

3. In summer thunderstorms are higher, anvil tops are more prominent; why?

4. Maximum turbulence in a thunderstorm can be expected in the area of highest water concentration. TRUE or FALSE?

5. If you disregard all advice and enter a thunderstorm, slow down, turn up cockpit lights and pitot heat, and fly attitude with is it preferable to go around a primary dependence on the ____ instruments.

See WHIZ QUIZ answers on page 48

"Everyone hears of serious aviation accidents, but few know of those that are prevented. . ." —Flight Safety Foundation

FOUR MILES FROM HOME

Several hours before sunset the standby air-sea-rescue helicopter pilot took off on a local VFR training flight. Besides the pilot, the HUP carried a plane captain and a passenger. After crossing the field boundary course was altered to the west with the pilot following a river. For about 6 miles the flight path wound back and forth along the river when the pilot reversed course and headed back to base, following a different river this time.

Witnesses reported the helicopter to be flying even with or above the hill tops (about 300 feet) until 4 miles from the base. At that time the pilot descended to little more than 100 feet above the river. "I suddenly saw many wires stretching across the river," said the pilot. "I applied power and 'up' collective in an effort to climb above the wires."

Numbers 1 and 2, plotted by the accident board, locates poles which supported the power lines. Number 3 refers to the area where the helicopter hit the ground.

Sparks flew as the HUP hit the power lines and it nosed down, struck the ground and burst into flames. Only the pilot survived.

Investigation showed the wires stretched across the river from a hill on the south, 225 to 250 feet high, across the river and valley for 450 yards down to dual poles 30 feet high in the river bottom. Height of the wires in line with the flight path of the helicopter was 125 feet. Nine strands of wires and 2 poles were pulled down by the impact.

In assigning cause factors the accident board said in their report that the common practice of spanning rivers and valleys by long, high runs of wire should have been taken into consideration by this pilot. His flight should have been conducted at least above the level of the adjoining ridge lines.

Although the SAR unit maintained a current chart of all known obstacles to flight and pilots were briefed on these and other potential hazards within the normal operating area, the wires which caused the crash, four miles from base, were not plotted.

A pilot who flew in the area the next day noted that the wires appeared to be of a galvanized material and no reflection from the sun was given off. The wires were extremely difficult to see at any angle of flight altitude.

"During many flights in this area," he said, "these particular wires had not been plotted because they had not been observed."

HOOKED — At mid-morning the air station was closed for 15 minutes in order to land an aircraft which had declared an emergency. By the time the field was open again nearly a dozen aircraft were waiting to land and numerous aircraft were ready for takeoff. Though the field had dual runways only one, the right-hand strip, was used for normal landings and takeoffs with FCLP conducted on the left side. It so happened that when the field was reopened the scheduled FCLP period was finished. Consequently the tower was able to use both runways to relieve the traffic congestion. It also so happened that the LSO had left the platform to refuel his mobile equipment and was no longer monitoring the landings on the left runway.

Enter a flight of three *Demons*. The leader calls for the break, gets clearance for the left runway and is advised that there will be landing traffic on the right-hand runway at the same time. Interest now centers on the number 3 man of the flight. "We made a normal break," he said, "and I lowered my slats and flaps to help me decelerate but left my gear up. The first two planes did not lower their gear and I thought I would wait for them . . ."

Just prior to rolling out on downwind the number 3 man saw the gear coming down on the jets ahead and he reached for a handle. "The pilot," said the accident report, "unthinkingly lowered his tailhook and was under the impression that he had lowered his landing gear." He called at the 180, reporting gear down, and was cleared to land and to recheck his gear. The pilot acknowledged this but did not look at his landing gear indicators.

While there was a wheels watch posted, he was stationed on the right-hand runway. With traffic landing on both runways the watch did not notice the wheels-up pass until the F3H was at the 45-degree position. Both the remote flare system and the radio equipped vehicle, normally available, were not in commission. By the time the wheels watch dropped his paddles, picked up a flare gun, took a few steps toward the left runway and actually fired the gun, the F3H was forward of the flare and committed to touching down.

A radio transmission warning

Same Song, Second Verse

Auxiliary power was being applied to the air starter unit of an A4D-1 prior to a local bombing flight. Before engine light-off, the *nose* gear began retracting. The pilot looked down at the landing gear handle, saw it in the UP position and slapped it full DOWN, but the gear continued to retract until the nose of the aircraft rested on the deck.

Another day, another NAS, another pilot preparing for another bombing flight in another A4D, signaled for starting air from the gas turbine compressor. Almost simultaneously with placing the throttle in the idle position and getting a light-off, the *main* landing gear retracted. The aircraft rolled back slightly and settled on the two drop tanks and tail section. The landing gear handle was found to be in an intermediate position, which appeared to be DOWN, but which actually allowed hydraulic pressure to flow to the UP side of the actuating cylinders.

Failure of the pilots to notice the position of the landing gear handles during their pre-start cockpit checks resulted in a total of 300 man hours spent in repairing the two aircraft. A thorough pre-start inspection of the cockpit, insuring that the gear handle safety override latch was engaged, would have prevented both accidents.

Watching the aircraft ahead, the pilot saw the wheels come down and reached for his own gear handle. He got the hook handle instead.

Continued from preceding page

of the wheels-up condition was made immediately prior to touchdown. The F3H remained on the runway during the ensuing slide and came to rest after 3500 feet of travel. There was no fire and no injury to the pilot.

In the final endorsement to the accident report there was information concerning the standard wheels-up warning system adopted by the Bureau of Aeronautics. It provides a flashing legend-type warning light mounted in the pilot's line of vision, and is activated when the wheels are not down and locked, the throttle is reduced below a certain rpm and the flaps are lowered (an RPM input is substituted on propeller type trainers for no flap landings).

This wheels warning system is included in the specifications for new production trainer and carrier-based fixed wing aircraft.

TIED DOWN — During the morning a HUP had flown two hours on personnel and guard mail transfer hops between ships and now it was on the carrier with rotors engaged, awaiting the signal to takeoff again on another flight. Time spent on the flight deck was brief. Upon landing the pilot had been instructed to keep the rotors engaged and immediately the helicopter was loaded with guard mail and other items for delivery to other ships. The pilot was given hurried instructions by personnel on the flight deck concerning the delivery of several items.

"I had received numerous last minute instructions on what I was supposed to do and was in somewhat of a hurry to clear the area," said the pilot. "Another HUP was waiting to land as soon as I cleared the area.

"Upon being cleared to go by the 'tower' I looked back and checked to see if the crewman was in his seat and ready. Then I looked out to the flagman and saw the flag being held up. At this moment I cannot say whether it was red or green and I did not double-check as I normally always do.

"Why I allowed myself to hurry I don't know, as I have thoroughly and conscientiously briefed the pilots and crewmen under me to never allow themselves to be hurried in any manner which might become dangerous or lead to an accident such as this. Be that as it may I did lift the helicopter off the deck not realizing the tiedowns had not been removed . . . "

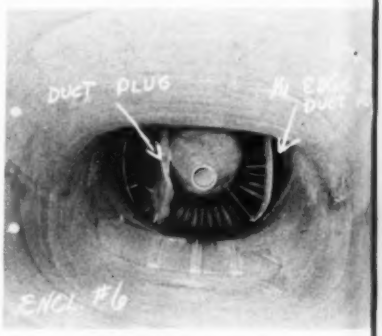
Two tiedowns had been attached to the HUP when it landed. This was not routine when an immediate takeoff is anticipated but was due to the wind conditions that prevailed at the time. Crewmen were standing by to remove the tiedowns on signal from the flagman and saw the oleos extend as power was applied but they interpreted this to be a mag check by the pilot.

When the lift was attempted the starboard oleo holddown ring broke. The port tiedown was attached to the fuselage clevis holddown which was of stronger construction. Feeling the pull to the left, the pilot applied full right cyclic in an attempt to land the HUP and lowered collective pitch to ease it on the deck. By then the helicopter was overbalanced and the pilot could not right it prior to the blades hitting the deck.

No injury to personnel resulted from the accident.

A contributing factor was considered to be distraction of the pilot though the pilot simply admitted, "this accident could have been prevented by my double checking for tiedowns. I normally do this and am unable to say why it escapted me this time."

Inattention from inside . . .



. . . and outside the aircraft.

CHOKED UP—Shortly before noon a pilot manned his FJ-4B to fly a mirror landing practice hop scheduled from 1200 to 1230. He had conducted a thorough preflight inspection and found no discrepancies but on his prestart cockpit check he noticed the aircraft had a full internal fuel load instead of the prescribed 2300 pounds.

Since it would have been impossible to burn down or dump the excess fuel to be below the maximum landing weight and still make the scheduled period, the pilot unstrapped and re-

turned to the line shack. As he walked away the plane captain of the FJ-4B replaced the nose plug and opened all the prescribed access plates and doors to ready the aircraft for a preflight by any other pilot who might be assigned to fly the jet.

Meanwhile, the squadron duty officer changed the scheduled hop into simulated instrument training flight and told the pilot to use the same aircraft. An assigned wingman moved off to one plane and the pilot returned to the flight line. He approached his airplane from the rear and directed the plane captain to close all access doors, considering it unnecessary to conduct another preflight inspection. "I observed that the covers were not on the yaw, and angle-of-attack probes," said the pilot, "but did not walk around the nose of the plane before entering the cockpit."

The plane captain buttoned up the starboard side and helped the pilot get strapped in. An airman who was assisting the plane captain took care of the port side but he also did not look into the nose intake or step in front of the plane at any time. After the pilot strapped in the aircraft was started and no malfunctions were noted.

Unfortunately the nose plug had not been removed.

After conducting post-start checks the pilot taxied out of the line to the duty runway. While turning up to full power on the duty runway he heard a loud noise and felt something strike beneath and forward of the cockpit. This happened simultaneously with the normal compressing of the nose gear oleo at about 80-85 percent power but he assumed damage to the nose gear and returned to the line. After shutdown skin damage in the intake duct and foreign object damage to the engine was discovered.

While much of the accident board's interest lay in the design of the intake duct plug for this particular aircraft one line of reasoning applies to all aircraft. This accident could have happened to almost any pilot, said the board, especially if he was certain in his own mind that he had just completed a very thorough inspection. However, when returning to the aircraft and seeing that its status had been changed (access doors reopened) the pilot should have been aware of the necessity of another walk-around.

In fact, even if the access plates hadn't been opened, a prudent pilot should always assume that the status of his aircraft could possibly change during his absence, no matter how brief, and should inspect it accordingly.

NO ISOLATED CASE—The same omission happened to an F3H. In this instance the pilot got airborne and was in the midst of a tactical maneuver when trouble developed. At 100 percent rpm, the throttle was put into afterburner and the engine flamed out.

On the way down a wingmate informed the pilot that the starboard intake cover was still in place. By leaning forward in the cockpit it could be seen. A restart was successful and was followed by a precautionary flameout approach and landing without damage.

LIFTLESS—Major W. de Kitkat-Watney's Nieuport Scout was extensively damaged when it failed to become airborne.

The original Court of Inquiry found that the primary cause of the accident was carelessness and poor airmanship on the part of a very experienced pilot.

The Commandant General, however, not being wholly convinced that Major W. de K-Watney could be guilty of so culpable a mistake, ordered that the Court should be reconvened.

After extensive inquiries and lengthy discussions with the Meteorological Officer and Astronomer Royal, the court came to the conclusion that the pilot unfortunately was authorized to fly his aircraft on a day when there was absolutely no lift in the air and could not be held responsible for the accident.

We extend our congratulations to Major W. de Kitkat-Watney on his reprieve and also on his engagement to the Commandant General's daughter which was announced shortly before the accident.—*Flight Safety, RAAF. Reference Summary of Aircraft Accidents July 1917.*

Buzz Boys

Approximately four minutes after two F8Us took off, the Station Operations Duty Officer commenced receiving calls from local residents reporting two F8U aircraft had "buzzed" the area at extremely low altitude. As a result of these reports, a preliminary investigation was conducted and forwarded to the Commanding General, Second Marine Aircraft Wing. The final disciplinary action taken in the case is quoted in part for information.

"... The flight leader will receive a letter of reprimand. The wingman will receive a private reprimand which will also be reflected in his fitness report. In addition, the flight leader is being removed from the fighter aircraft program."

NOTES FROM YOUR FLIGHT SURGEON

Complacent

"ONE day, about half way through my last cruise, I was getting a cup of coffee after a recovery. Suddenly, I wondered if I had received a CUT . . . (This was one of those old fashioned carriers with a straight deck and barricade.) Well sir, I'll tell you for sure, I couldn't remember! The last thing I could remember was coming up the groove and feeling good. I know I was right and knew I was going to get aboard. The deck was clearing rapidly, I was on speed and I knew my altitude was right because it was one of those rare days in the Med when the horizon was like a knife-edge. That was the end of remembering though . . . for the life of me, I couldn't remember seeing a CUT.

"When the LSO came in to debrief us, I was all over him like a dirty shirt to find out if I had really been given a CUT. I had, says he. It was an okay pass. Then I asked a couple of our finer type carrier pilots if this had ever happened to them. They both said no but within a week both came around to tell me that it had indeed happened to them. We kicked it around a bit and decided we were getting too darn sure of ourselves. We were used to getting aboard and not getting wave-offs. *In fact, we were getting complacent about the whole thing.*

"We learned our lesson—it shook us up a bit to realize what we'd been doing. It's a lesson for all of us. Many of us have more than likely found that we can get aboard with a high or low meatball every so often. We have gotten aboard with our speed not just right. Some of us are such old hands at the game that we can tell the LSO what we did wrong on the pass before he gets his mouth open. We are experienced carrier aviators and pretty proud of it but we can't afford to be lulled into a false sense of security. The record shows that an awful lot of boys with a high number of carrier landings are bustin' them up."—*(adapted from 15 Feb 59 Crossfeed)*

Did You Know Dept.

DID you know that: Anti-histamines taken as self-medication for colds, hay fever, sinusitis, etc., are depressants and may result in anything from drowsiness to severe depression with accompanying adverse effects on depth perception and hearing?

Some anti-biotic drugs (Streptomycin and Dihydrostreptomycin) can cause hearing and vestibular damage and dizziness?

Curative drugs such as the sulfonamides (e.g. Sulfanilamide), antimalarials (e.g. Quinine) and the decongestants (Privine) can cause various visual and hearing difficulties (i.e. deafness, loss of depth perception) and a reduction in tolerance to hypoxia?

From the above, it should be evident that self-medication is extremely dangerous for flying personnel. Even simple remedies which are obtainable without prescription such as aspirin, antihistamines, cold tablets, cough mixtures, laxatives, tranquilizers, etc. may seriously impair the fine coordination and concentration required in flight. *TAKE NO PILLS OR MEDICINE UNLESS PRESCRIBED OR APPROVED BY THE FLIGHT SURGEON.*

2nd MAW "Hot Dope Sheet"

Sizing Things Up

WHEN you have a Hardman oxygen mask retention system installed on your APH-5 helmet, make sure that the retention system and your oxygen mask are the same size. If you use a *small* size oxygen mask, you need a size *small* Hardman system . . . a *medium* mask, a *medium* Hardman system . . . a *large* mask, a *large* Hardman system. (Applicable stock numbers for the Hardman retention kits are: small—R1660-602-7163-LA20; medium — R1660-602-7136-LA20; and large—R1660-602-7137-LA20.)

Why the necessity for matching sizes of oxygen masks and Hardman retention systems?

The wrong size Hardman retention system on your oxygen mask can do two things: 1) compress the outlet port and drastically interfere with your exhalation (no oxygen out means no oxygen in) and 2) produce an extremely sloppy fit which can result in oxygen leaking out of your mask and ambient air leaking in.

For the straight scoop on the installation of the Hardman oxygen mask retention system on the APH-5 helmet, see BACSEB 17-58 of July, 1958.

With, or Without?

AT 120 KNOTS and 6000' down the runway on a night takeoff in an F3H-2N, the pilot eased back on the stick to place the aircraft in a takeoff attitude. Immediately thereafter, the landing gear folded and the aircraft fell to the runway. It skidded approximately 300' off the end of the runway and came to a stop in an upright position with the aftersection on fire.

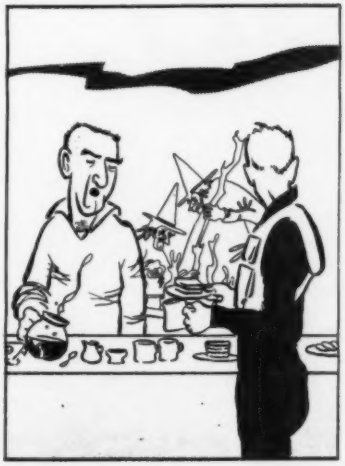
The pilot evacuated the cockpit without injury although he made the mistake of removing his oxygen mask and helmet first. This equipment offers excellent protection from burns about the head and should be retained during evacuation from a burning aircraft. The pilot also took off his parachute before leaving the cockpit.

There are two schools of thought on abandonment of aircraft with or without equipment. It is an unrealistic approach to the problem to make a firm statement on whether you should or should not abandon the aircraft with specific equipment. The conditions at the time of the accident with respect to danger, damage, injury and personal training should dictate the action to be taken.

What training have you had? What techniques have you been taught? Do you consider this training and these techniques satisfactory for all conditions involving abandonment of your aircraft?

Panic Reaction?

DURING the rollout after an emergency landing in an FJ3 with the nose gear not fully extended, the pilot jettisoned his canopy by pulling the face curtain to the first stop. He said later that he forgot about the emergency canopy release and, instead, used the face curtain. This could have proven extremely dangerous. Pulling the face curtain to jettison the canopy also arms the ejection seat. It is not known why the pilot did not use the proper emergency procedures in this situation, possibly due to a panic reaction or a lack of training. Only through constant training and periodic review of all emergency procedures can a pilot expect to respond quickly and correctly to emergency situations.



. . . our coffee is out of this world, sir.

G-Whiz

A TV-2 pilot had secured the aircraft following a routine test flight and climbed out of the cockpit when his G-suit connection lifted the landing gear lever to the up position causing the nosegear to retract. The plane came to rest on its nose and main gear.

The pilot neglected to seat the landing gear handle in the down position and was therefore able to lift the handle when the still connected G-suit hose caught under the landing gear lever.

Locked and Slack

IT PAYS to wear your shoulder harness locked and *tight*—an F9F-5 pilot learned this the hard way some time back.

Trying to save a bad approach, the pilot attempted to land although he was coming in too fast. The aircraft continued off the runway, down an incline and through the boundary fences of the airfield. The plane slid across a highway and finally came to rest in an open field.

Earlier in the hop, the pilot had loosened his shoulder harness and had not tightened it again.

While the aircraft was decelerating after leaving the runway, the pilot's head snapped forward and against the control stick. The scalp laceration hospitalized him for two days and grounded him for three weeks. Otherwise he was uninjured.

Improper engine trim can really cause trouble at altitude.

JET-SET

Courtesy of Dana Goodrich
Field Tech Rep of
Pratt and Whitney Aircraft

PRATT and Whitney Aircraft has consistently recommended the measurement and setting of engine thrust by use of tailpipe total pressure (Pt7) and compressor inlet total pressure (Pt2) as the primary parameters, while using engine speed, tailpipe temperature, and fuel flow as secondary parameters to monitor engine condition and as limits. Complete tailpipe instrumentation, including averaging probes, and in some cases external manifolds, are supplied for this purpose as part of the engine.

On modern turbojet engines, such as the Pratt and Whitney Aircraft J57 and J75 engines, RPM is not a significantly accurate indicator of thrust to provide adequate control of engine thrust and internal conditions, under normal service operations. Therefore the fuel controls for the J57 and the J75 engines provide for adjustment (or trimming) of the maximum fuel control schedule so as to obtain the desired maximum Pt7 under all ambient conditions.

The F4D-1 aircraft are equipped with Engine Pressure Ratio gages which predicate tailpipe total pressure (Pt7) versus ambient static pressure (Pamb). The gage receives a balanced signal of Pt7/Pa. The ambient static signal comes from the static side of the pitot-static system. *This is the only cockpit instrument which can be used to measure net thrust developed during the full power turn-up prior takeoff.* RPM, fuel flow and TPT are, of course, significant in that they will tell the pilot the amount of work the engine has to do *in order to produce the required pressure ratio,* and they are also used to determine whether or not a low pressure ratio indication is an instrument discrepancy or an engine problem.

Experienced F4D-1 operators recommend that a pilot should return to the line if the combination of engine instruments used in conjunction with the pressure ratio gage indicates an engine low on thrust. In some cases where determination of pressure ratio instrument accuracy or reliability cannot readily be made by the pilot, it is recommended that a return to the line be made when this instrument alone indicates low thrust. The knee-pad curves used with this instrument outline the *minimum* thrust requirement in terms of pressure ratio for any given ambient condition. Average instrument accuracy factor is about 2 percent. The pressure ratio developed by the engine during the full-power turn-up should be on or slightly above this curve for the existing runway temperature.

The F8U-1 aircraft is equipped with a tailpipe total pressure gage, sometimes called a TOP (turbine out pressure) gage, or a Pt7 gage. This instrument measures tailpipe total pressure without reference to ambient conditions, but the related curves provided for the pilot take this into consideration. As in the F4D, this gage is the only one in the cockpit which can measure net thrust developed by the engine at the time of full-power turn-up. In conjunction with RPM, TPT and fuel flow, which can be used to indicate the internal condition of the engine, and will indicate the amount of work done by the engine to produce the TOP, the TOP gage is the *go* sign for the F8U pilot.

The trimming of engine fuel controls should always be done under precisely controlled conditions. This precise control is both desirable and necessary to assure maintenance of a minimum thrust level upon which aircraft performance is based, to avoid needless flight problems involving over-temperature indications and possibly to avoid engine stall during critical aircraft maneuvers.

In addition, precise control of engine trimming contributes to better engine life in terms of both maximum time between overhaul and minimum out-of-commission time due to engine maintenance requirements. Concern for maintenance of a minimum thrust level dictates a minimum Pt7 to which a control should be trimmed under a given set of ambient conditions. Therefore, in practice, it is desirable to hold the band or spread between acceptable Pt7 indications as narrow or small as is consistent with reasonable maintenance procedures and engine and control repeatability.

J57 engine maintenance people should remember that the aircraft-installed engine instruments are not considered sufficiently accurate or reliable for use as engine trimming equipment. The Jet-Cal should be plugged in to bypass with the installed TPT instrument, and Tak-Cal (a part of the Jet Cal box) should be plugged into bypass the installed tachometer.

Improper J57 engine trim can really hurt at altitude, and can also affect afterburner performance. Low trim will result in a pilot having difficulty maintaining speed and altitude during the mission, and the afterburner fuel flow will be leaner than is optimum for a given altitude. High engine trim will force the pilot to modulate the basic engine at altitude in order to keep TPT within limits, and will cause the afterburner fuel to be richer than optimum for a given altitude. Either condition can cause afterburner blowouts and reduce afterburner light-off ability in flight.

Afterburner fuel flow will be lower than optimum at a given altitude if your engine has been trimmed too low.

Precise engine trim contributes to better engine life.

Manifold pressure gages used for monitoring Pt7 during engine trim runs should be of the sensitive, double-needle type, and should be accompanied by current calibration cards which record the instrument errors. These instruments receive rough treatment, and it is suggested that they be calibrated every 30 days when practicable. The maintenance force should have two of these instruments assigned. ● 37

THINK,

TRIM devices of various sorts are used to control the balance of an aircraft so that it will maintain straight and level flight without undue pressure on or displacement of the cockpit controls. Without trim devices a pilot would find it quite a problem to keep his bird flying straight and level as he operated at various airspeeds with varying CGS, due to fuel consumption, passenger shifts, . . .

These trim devices vary as the design of the aircraft dictates. The design which will do the trick on an L-5 isn't going to do on an irreversible power control system in present high-speed aircraft. This is why we have different systems of trim, such as fixed trim tabs, adjustable trim tabs, servo tabs, and trim devices which change the geometry of the control system to produce the proper control surface change. Each aircraft designed has its own way of setting trim. However, an aircraft which may be flown straight and level and with a minimum of pilot fatigue is the end result. Control operation is also kept within the physical limits of man.

Today we have two ways of making a trim change in our aircraft. The most common and unsophisticated method is to change the lift characteristic of the airfoil by changing its camber. This can be done to the wings or the tail surfaces by movement of ailerons, rudder and elevators. As can be seen in Figure 1, a movement of the control surface will either increase or decrease the net air load acting on the airfoil. To obtain this movement, trim tabs are employed, the tab does to the control surface precisely what the control surface does to the wing, vertical fin and horizontal stabilizer. The tab gives us a means of producing control surface deflection, which in turn changes the net air load acting on the airfoil.

By the way, what is camber? Camber is the convexity of an airfoil. It is the rise of the curve of an airfoil section from its chord. From this definition it is safe to say that we produce control surface camber as shown in Figure 1.

A look at Figure 2 will show that a trim tab has been added which may be used to change the control surface. The tab air load produced is in the opposite direction from the air load of the main surface and was produced by moving the tab in the direction opposite to which we want the control surface to move. Got it? The control will go in a direction opposite the tab movement.

Figure 1.

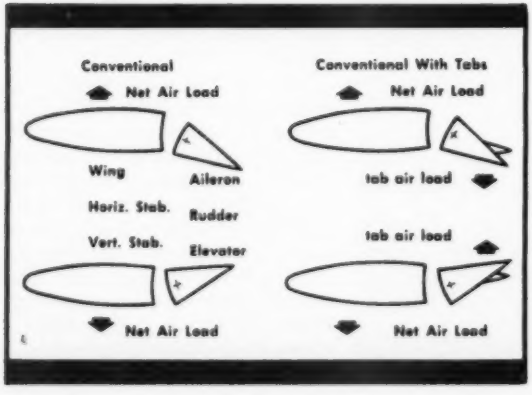


Figure 2.

Figure 3A.

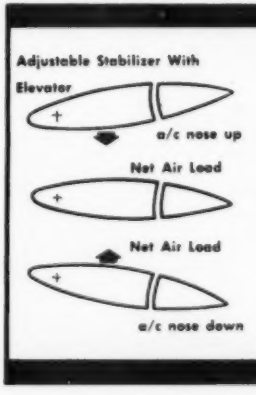
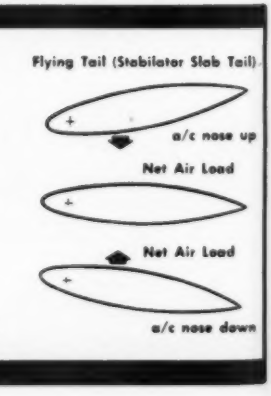


Figure 3B.



..., *then* TRIM

Up to this point we have been getting our directional change by varying the camber of our flight surfaces to establish trim change. Another way to trim the aircraft is to change the angle of attack of the horizontal stabilizer or vertical stabilizer. As the angle of attack changes, so will the lift of the airfoil. A look at Figure 3 will reveal which way the stabilizer or stabilator must be moved to produce a change in air load. The leading edge of the surface will move in the direction opposite to the nose of the aircraft.

With irreversible control systems, trim tabs would have no effect in repositioning the control surface. For proof of this, try to move a power-boosted, irreversible control surface by pushing it with your hand while system power is ON. To trim an irreversible control, you reposition the entire surface by changing the control system geometry. Now, when you trim, you have to remember that actuation of the trim system will result in repositioning of the control surface itself. With irreversible controls the surface is trimmed in the direction it is to go, while with the trim tab system the tab will go opposite to the desired control surface movement.

When this trim system is checked, a good deal of confusion is created as a result of inadequate coordination between the man in the cockpit working the trim and the man on the ground checking control movement. If the man in the cockpit calls, "nose down," it must be understood by the checker which "nose" is being referred to—aircraft or control surface. It is very easy for a man to hear "nose down" and then see the nose of the stabilizer go down and not realize the error that exists.

Perhaps it might help if the man in the cockpit called: "AIRCRAFT nose down" and "AIRCRAFT nose up," while the checker would call back: "STABILIZER nose up" and "STABILIZER nose down."

In checking a trim system, the checker must know what effect he is trying to produce on the aircraft and what must be done to gain this effect. Perhaps the chart may be of aid if clipped out and saved.

Remember, in today's aircraft, the trim is being used as a primary control device. The life of the airscrew and the completion of a mission will depend on the proper response from the aircraft trim system. Know what is expected of your aircraft's trim system. Don't set the stage for an accident.

A GUIDE FOR CHECKING TRIM DEVICES

to obtain	with TRIM TABS, tab should go	with IRREVERSIBLE CONTROL SURFACES, trailing edge should go	with FLYING TAILS, SLAB TAILS, STABILATORS, ADJUSTABLE STABILATORS, etc., surface nose should go
aircraft nose DOWN	UP	DOWN	UP
aircraft nose UP	DOWN	UP	DOWN
aircraft nose RIGHT	LEFT	RIGHT	LEFT
aircraft nose LEFT	RIGHT	LEFT	RIGHT
left wing DOWN	DOWN (left tab)	UP (left aileron)	
left wing UP	UP (left tab)	DOWN (left aileron)	
right wing DOWN	DOWN (right tab)	UP (right aileron)	
right wing UP	UP (right tab)	DOWN (right aileron)	

—Courtesy USAF "Maintenance Review"

FROM THE GROUND UP

Notes and Comments on Maintenance

EAGER BEAVER

This NC-5 was driven into position in front of a P2V in order to start the aircraft for a hydraulic system check. The NC-5 was parked perpendicular to the nose of the aircraft. The hand brake was set and the gear selector placed in NEUTRAL. The driver left the vehicle in order to help plug the power cord into the P2V.

The driver then returned to the NC-5, held the clutch in with his left hand, engaged the generator, released the clutch and pulled the throttle out. The NC-5 moved forward, picking up speed and traveled 120 feet contacting the starboard propeller of an adjacent P2V.

The safety device installed on the Szekely NC-5 malfunctioned in such a manner that when the power takeoff handle was moved forward to engage the generator it moved the gear selector from neutral to forward gear.

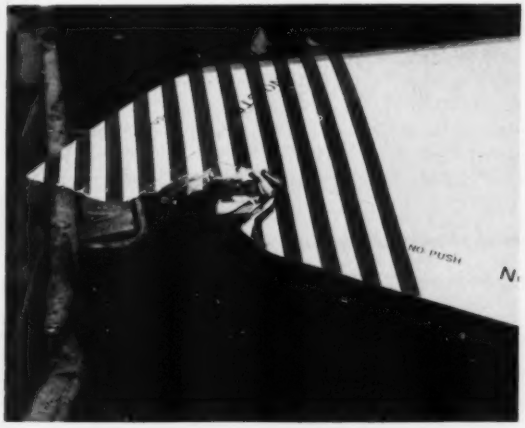
It was recommended that a fool-proof modification be devised to prevent this type of accident. It was also recommended that the current power takeoff safety device be inspected daily and drivers have been instructed to occupy the driver's seat when engaging or disengaging the generator power takeoff.

HIGH OLEOS & OVERHEAD CLEARANCE—While the A3D-2 was being towed from the starboard elevator into the hangar deck, personnel failed to check overhead clearance. The port wing tip struck the overhead causing subsequent damage. The jury strut holding down the port wing was not retracted to the last detent. The clearance of six inches under normal conditions is quite small so that any abnormal condition such as the *jury strut not retracted, a high oleo (low fuel state) may* cause the wing tip to strike the overhead if extreme caution is not exercised.

Aircraft handling personnel should know that high oleos on A3D struts raise the folded wing tips to a height which may cause contact with the hangar deck overhead of MIDWAY class carriers. Oleos on A3D aircraft should be checked carefully each time a plane is brought from an elevator into the hangar bay for proper tolerance.

Hangar deck crews should be aware that it is possible to install jury struts in such a manner that the wings will be raised the additional few inches which will allow contact with the overhead.

Plane captains must ensure that jury struts are fully retracted to ensure proper hangar deck clearance.



"No Push" warnings on the horizontal tail of this F8U-1 "cried" their message in vain when PriFly raised the ship's antennas into them—the Flight Deck crew had failed to check clearances before signaling "Okay to raise."

SPEED BRAKE CLEARANCE—During acceptance check the AD-5 was on wing and tail jacks for drop check of landing gear. Speed brake switch was moved to OPEN. Speed brakes extended striking concrete deck. Twelve inches of trailing edge of speed brake bent upward three inches—requiring speed brake change.

The tail jack was not fully extended. The mechanic elected to test the speed brake for operation. He was not sure of efficient deck clearance but decided that should the brake approach the deck that the switch would be moved to CLOSED. He was not aware of the speed and force with which the speed brake would be actuated, consequently it was fully extended striking the concrete deck.

To prevent future accidents of a similar nature the reporting activity directed that whenever the aircraft is mounted on jacks where such operation is likely to take place, the jacks be fully extended in order to provide adequate clearance.

CAN YOU TOP THIS—Forward rotor blade of the HUP-2 was struck and damaged by the forklift being used to pick up chocks from the flight line.

LASH-UP — During the preflight turn-up, a wrench that had been left in the intake duct was sucked into the first row of compressor rotors of an F3H-2.

Upon completion of work on the hydraulic sys-

Continued from preceding page

tem, a wrench was left in the intake duct.

Recommendations: In addition to an inventory check-off list, all tools and equipment will be physically secured to men working in or around the intake area.

A wrench was brought to the work area without being inventoried. This wrench was not taken into account by the Foreign Objects Damage Petty Officer who inspected the aircraft and conducted the inventory after the completion of work and prior to turning up the engine. The wrench was in such a position that his inspection plus that of two supervisory aviation metalsmiths failed to detect it.

PENNANTS FOR DISCONNECTED THROTTLES—An alarming number of AD aircraft accidents have been attributed to failure to properly secure and cotter pin the carburetor throttle rod. BuAer states the following preventive measures are mandatory:

A red pennant approximately three feet long by four inches wide should be made to be attached to the cowling when the throttle rod is disconnected for any reason, and during engine change. Attach the pennant in a conspicuous location and in such a manner as to prevent installation of the throttle rod access cowling, if possible.

The pennant should not be removed until ready to install the throttle rod access cowling and a final check of the rod for proper security has been made. *Ref. BuAer Disp 0121383 dated Aug 1958.*

REVERSED TRIM—When an S2F-1 pilot attempted to actuate the aileron tab, the tab lowered the right wing when left wing down was called for. He landed the aircraft uneventfully. It was determined the aircraft had flown 53 hours since the tab and motor was installed. Color coding on the wiring coming out of the motor was reversed during overhaul.

Trim tabs should always be checked for proper operation and direction of movement after maintenance or repair on any part of tab system. (Please "Think, then Trim," page 38).

MISRIGGED—Upon indications of excessive back yoke pressure to raise the nosewheel off the runway, the pilot of an S2F-1 aborted his takeoff, dropped the tailhook and engaged the field arresting gear which brought the aircraft to a safe stop on the runway. The emergency field arresting gear prevented this aircraft from proceeding off the runway and into a lake. The aircraft was being test flown following the installation of a new port elevator.

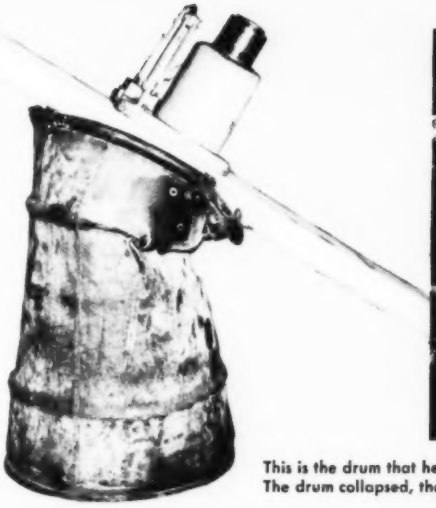
Investigation revealed that the port elevator balance tab assembly, geared left-hand, part no. 89T-1006-8, refer. AN 01-85-AA-4 Figure 53, Index 9; had been rigged to match the starboard balance tab which remained as originally set. As a result, both tabs were rigged in the ⅜ up tab which caused the nose-down condition. No previous nose-down gripes were noted on this aircraft prior to installation of the new elevator. Rigging both balance tabs in the NEUTRAL in accordance with the HMI procedure corrected the condition as substantiated by a subsequent test flight.

Attention Aircraft Maintenance Officers

Have you read BuAer Instruction 5440.2? This instruction provides an organization and procedures manual for use by all Naval Aircraft Maintenance Activities performing Class "C", "D", "E", and "F" aircraft maintenance.

Recent studies have pointed out the urgent need for improvements in aviation logistic support, including aircraft maintenance, in order to accomplish a high degree of aircraft readiness and flight safety. These studies have specifically recognized the need for a high degree of organizational uniformity within activities performing Class "C", "D", "E" and "F" aircraft maintenance, if maximum improvements are to be obtained.

In recognition of this factor, the Chief of Naval Operations and various operating commands requested an early promulgation of this manual. Although the manual was distributed over two months ago, it is understood many aircraft maintenance officers are unaware of its existence. It is suggested you contact your local publications center and request a copy of BuAer Instruction 5440.2, Aer-512 of 23 September 1958; Subj: "Organization and Procedures Manual for Aircraft Maintenance Activities."



This is the drum that held the jack that held the 'copter,
The drum collapsed, the strut was loose and the deck stopped her.*

JACK LEG

The HUS-1A helicopter was being jacked up for the purpose of removing the emergency flotation gear. The proper jacks were not available and in their place a metal drum was utilized in conjunction with a 5-ton hydraulic jack. This drum was not adequate support for this model aircraft and buckled under the weight of the aircraft. When the metal drum buckled the right main gear shock strut was not secured. The right main gear shock strut had been disconnected in order to elevate the gear and remove the flotation equipment. The helicopter fell on the starboard side damaging the right bottom side of the fuselage and one main rotor blade.

The cause of another accident involving another HUS was also attributed to the lack of tripod type jacks (stock no. R1730-391-7897-S030).*

Field expediency type maintenance often requires ingenuity and resourcefulness. Non-availability of equipment contributes to some accidents but there appears to be very little excuse for poor judgment displayed in these two cases. In this latter accident the left gear was jacked and the tailwheel was left *unlocked*. The tailwheel castered causing the copter to fall off the jack.

Proper supervision, common sense and good judgment are the essential accident preventives here.

* All aircraft jacks are currently in a critical supply status due to our program of standardization to Air Force jacks. It is requested that all inoperative jacks be turned into O&R for repair; currently-stocked jacks are to be utilized to the fullest extent until present stocks are exhausted.—*ASO Logistics Bul. 189, 20 March 1959*

** The skipper's verse was even worse!*

Please turn page

Continued from preceding page

OVERTORQUED FUEL FITTING—Upon moving the mixture controls to IDLE CUT-OFF, at the completion of a 1.5-hour VFR flight an aviation fuel fire commenced in a TF-1's port engine accessory section. The pilot noticed the port fire warning light come ON after the fuel selectors and ignition switches were turned OFF. The pilot attempted to blow out the fire by cranking the engine over with the starter. Station firefighters arrived on the scene and extinguished the fire.

The 90-degree elbow union connection (see photo) at the *output* side of the engine driven fuel

This elbow fitting was overtorqued.

pump had fractured flush with the pump body.

Upon removal of the pump by squadron maintenance personnel, the elbow union connection and attached fuel line separated completely from the remainder of the connection still in the pump body.

A close inspection revealed the presence of peening on ⅔ of the surface of the suspected fracture, indicating the fracture possibly occurred prior to the fire. The original fractures possibly occurred when the union connection was overtorqued at installation.

The remaining ⅓ of the fracture and subsequent complete separation of the connection upon removal of the pump and the fuel line was believed to be caused by the contraction of the metal when the CO_2 extinguishing agent was directed into the accessory section, or by the CO_2 probe used by firefighters.

This incident illustrates the need for constant vigilance to ascertain and to apply only the correct torque settings used in such critical areas as fuel systems and associated components.

NO OIL SIGNS—The P2V-5F's engines were started for engine check-out after a major aircraft check. Oil had not been replaced in the engines, nor were they marked in accordance with existing squadron procedures. The port engine was started and running then the main inverter was turned on and fuel pressure noted, followed by starting the starboard engine. The port engine had been running about 3½ to 4 minutes and the starboard less than one minute when the oil pressure gages were noted to have no indicated pressure. Both engines were immediately secured with mixture controls. Subsequent inspection revealed possible internal bearing damage to the port engine and no apparent damage to the starboard engine. The port engine was changed.

Cause: 1. The plane captain did not utilize proper engine starting procedure; a. Inverter Off (no engine operating instruments). b. Mixture controls engaged before oil pressure indication was observed.

2. Supervisory error in that maintenance check crew personnel failed to mark the engines in the prescribed "No Oil" signs, attached to propeller blades.

3. Supervisory error in that the squadron maintenance procedure did not require "No Oil" sign to be attached to the throttle or in the cockpit.

4. Supervisory error in that a visual oil quantity check was not required by the squadron Major Check sheet.

Action: 1. A formal board of investigation has been appointed to investigate the facts surrounding this case.

2. Reemphasize within the squadron training program the requirement for proper engine starting procedure.

3. Reemphasize to all maintenance check crew personnel the requirement for attaching "No Oil" signs to the propellers of engines which have the oil drained.

4. "No Oil" signs have been fabricated and will be required to be attached to the throttles of squadron aircraft when the oil is drained. These signs will be removed only after the oil tanks are refilled.

5. A visual oil quantity check will be added to the squadron Major Check sheet.

6. The squadron is receiving aircraft from overhaul with the autosyn instrument system (service change 666) installed. The engine start check sheet is being revised to include turning on the main inverter prior to starting the engine on these aircraft and maintenance personnel will be required to utilize the revised check-off sheet.

7. The plane captain in this case will be required to requalify and additional future action will be dependent upon the recommendation of the Formal Board of Investigation.

This standard "insert chocks" signal was mistaken to mean "down elevator" by the operator because he could see only one hand, center.

Reenactment of the accident brought about a new signal—now a thumbs-down pointing into the palm of the other hand is the signal for "down elevator."

"Elevator Down" Signal Change

"It is recommended that a standard procedure be adopted by the Air Department and Air Group as follows: when a plane handling accident occurs, the Air Officer convene a critique of persons involved or likely to be involved before secure of flight quarters for the purpose of

a. reenacting the accident
b. establishing personnel errors
c. determining negligence involved and
d. taking preventive action for recurrence of a similar accident."

—From a FLIGA Report

The following is a prime example of the results of this procedure:

AN F3H-2 was towed forward on the flight deck and placed on the number one elevator so that the tail was approximately 4 to 8 inches from the edge. The towing tractor, still attached to the aircraft by the tow bar, was on the flight deck with about 9 inches of the rear end extending over the elevator. All four wheels were on the flight deck. The plane director blew his whistle, which is a standard signal to stop the aircraft, and signalled "insert chocks."

The "insert-chocks" signal was the standard signal of clenched fists with thumbs extended being moved laterally towards each other. The director was on the port side of the aircraft just forward of the tail and the elevator operator was located at the after part of the elevator on the starboard side. Unable to see the director clearly, the operator mistook the "insert-chocks" signal as the signal to "lower elevator," which is the thumbs-down sign. As the elevator operator sounded the warning horn and pressed the power switch, another operator located on the hangar deck sounded the horn and pressed his power switch (both switches must be pressed in order to raise or lower the elevator).

As the elevator began to lower, several men shouted to stop it and both the phone talker and elevator operator pressed, or tried to press, the emergency stop button, but the elevator continued to descend. (Immediately following the accident the emergency stop button was checked several times and worked perfectly each time.) The tractor driver attempted to jump to the flight deck but failed and fell into the elevator shaft, hit on the nose of the plane, fell to the elevator deck on the port side and rolled onto a ledge in the elevator shaft. He sustained only minor injuries.

The tractor was pulled into the shaft and fell on the nose of the plane just as the driver fell off. The tractor then fell to the starboard side of the aircraft onto the elevator deck.

The accident was caused by the elevator operator mistaking an "insert-chocks" signal as a "lower elevator" signal. It was recommended that *plane directors should be in FULL view of the person or persons to whom he is giving the signal.* Also, a new signal has been devised for "lower elevator." In order that both hands may be seen, the signal is now a thumbs-down with the thumb pointing into the palm of the other hand.

MURPHY'S LAW*

Hose Coupling WARNING

THE pilot of an AD-5 noted complete loss of hydraulic pressure during a routine training flight. Landing gear was lowered with emergency system and an arrested emergency landing was made.

Inspection revealed that a hydraulic aeroquip self-sealing coupling assembly, part no. 014520-16D, located immediately under the hydraulic reservoir in the suction line between the reservoir and engine-driven pump was mismatched preventing its locking mechanism from locking (left photos, adjoining page). The coupling assembly, part no. 014520-16D normally consists of the following parts:

(a) S1 coupling half, 140-S1-16
(b) S2 coupling half, 145-S4-16
(c) Union Nut, 014520-25-16

The S2 coupling half, 155-S2,16D (photos right, adjoining page) was installed in the aircraft vice the 145-S4-16 coupling half. The 155-S2-16D half has 10 threads whereas the 145-S4-16 half has 8 threads. The union nut has 5 threads. When the union nut 014520-25-16 is torqued up the lock mechanism does not engage due to the excessive length of the 155-S2-16D coupling half (see photos, left, next page). The unsecured union nut backed off which closed the self-sealing coupling thereby preventing hydraulic pressure.

These parts are not interchangeable due to internal design differences. It is imperative that individuals ordering and installing components be sure of proper part numbers.

This is a MURPHY condition. Since all —16 components screw together and can be mismatched, a flight safety condition can recur. Reference should be made to Accessory Bulletin 9-54 for proper installation and inspection instructions for aeroquip self-sealing hydraulic, fuel and oil system couplings. It does not, however, specifically warn of the consequences of mismatching the —16 components.

The reporting activity states its investigation revealed that in practice none of these couplings were wrench-torqued after hand-tightening in accordance with Accessory Bulletin 9-54. In addition, it is evident that through lack of proper instruction, overhaul and servicing personnel are not familiar with the visual inspection instructions for these couplings. The unit cited the Aviation Structural Mechanic 3 and 2 Navy Training Course, NavPers 10326 dated 1958, page 54, does not show proper inspection procedure and warns *against* use of a wrench for torquing. This is *contrary* to Accessory Bulletin 9-54 and the Aeroquip Corp. instructions. Due to the safety of flight of these couplings, it is strongly suggested that operating and overhaul activities be thoroughly educated in their proper assembly and inspection procedures.—*Contributed by NAS, Seattle.*

* If an aircraft part can be installed incorrectly, someone will install it that way!

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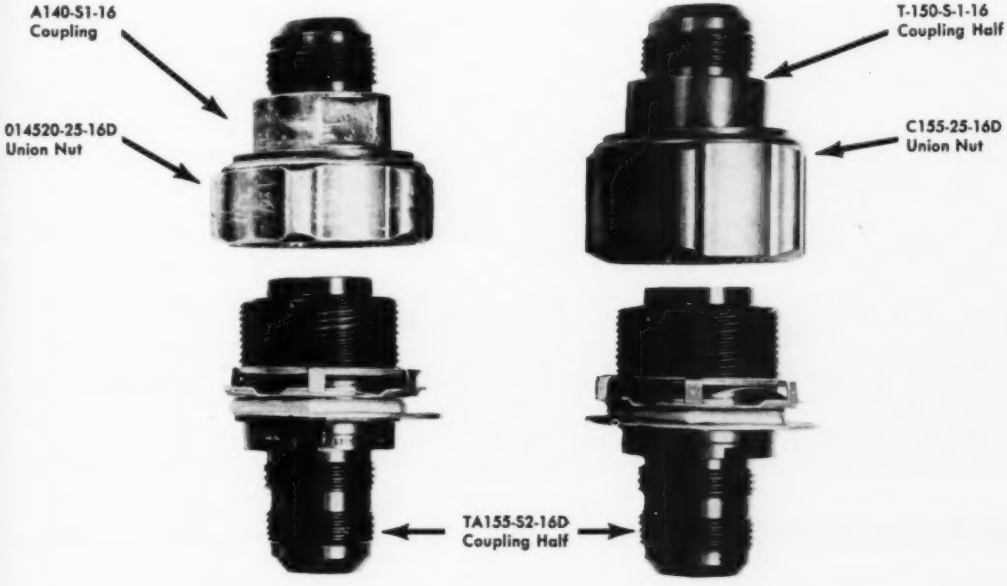
If an aeroquip quick-disconnect coupling half and union nut combination such as is shown in the illustrations on the left half of this page is connected to a TA 155-S2-16D coupling half, the valve will open normally but the union nut will not engage the lock spring assembly which causes an unsafe condition. Union nut 014520-25-16D has only five threads whereas the TA 155-S2-16D half has 10 threads; the union nut contacts but does not compress the lock spring assembly. Note: Mismatching combinations are also possible when using other aeroquip quick-disconnects. To avoid this booby trap refer to Accessory Bul. 9-54 whenever parts of these assemblies are ordered or changed.



Clipboard

Night 'Copter Rescue Advice:

At night recommend using landing light, aux landing light, and hover light for actual search; when over rescuee they should be turned off as they reflect into the aircraft (HUP) when rescue hatch is open. *—From a Helicopter Rescue Report.*

Clue to Door Trouble

DUE to heavy winter gear, it was difficult for troops to climb aboard helicopters. This was aggravated by the men's thermal boots not fitting the step, and inadequate handholds on the helicopters. Because of the latter, men were pulling themselves aboard by grasping the cabin door, resulting in the door track being distorted in some cases, and one door falling out in the pick-up zone.—*1st MAW "Wing Tips"*

One for the Birds

A P2V-5F made a night takeoff without landing lights at 0550 on Runway 27 at NAS Jax. As the aircraft was 5 feet above the deck and climbing after 4000 feet of takeoff roll, it flew through a flock of 100 to 150 irate sea gulls which had been roosting on the runway. The pilot contacted the tower and circled the field three times to assess the damage. Because of the darkness, he could only see that he had lost his port windshield wiper. Instruments were normal. He landed with no further trouble.

Aircraft Parts Replaced or Repaired: port windshield wiper, flat top antenna, searchlight dome and starboard top section of cowl. Both jets required inspection for possible foreign object damage. Direct man-hours: 75.

Anti-Sea Gull Measures Taken: All squadron pilots have been instructed to confirm with tower prior to takeoff at night or in poor visibility that the crash truck has reported the runway clear.

MOR Form Error

There is an error in the current supply of Medical Officer's Report (OPNav Form 3750-8) in instruction number 2 on the upper stub of page one. (Ref: CNO Dispatch 132006Z of March 1959). Paragraphs 57 and 58 of OpNavInst 3750.6C should be complied with.

Reduce Communications

TOWER controllers at Chicago Midway Airport report that pilots can help reduce communications on approach control by advising on the initial contact that they have the wind and runway data. (Some prefer to say they have the "numbers," however, either will be okay with the tower.) Quite probably other high density areas where approach control procedures are in use would also appreciate pilots using this procedure. *—ALPHA "Technical Talk"*

Answers to Quiz, page 29

1. RIGHT
2. FALSE
3. Icing level is higher
4. TRUE
5. Gyro

Readers are invited to read "Thunderstorms"—Aerology Series No. 2; NavAer 00-80U-2, "The Thunderstorm," NavAer 50-1B-508, and the chapter on thunderstorms in the All-Weather Flight Manual (NavAer 00-80T-60).

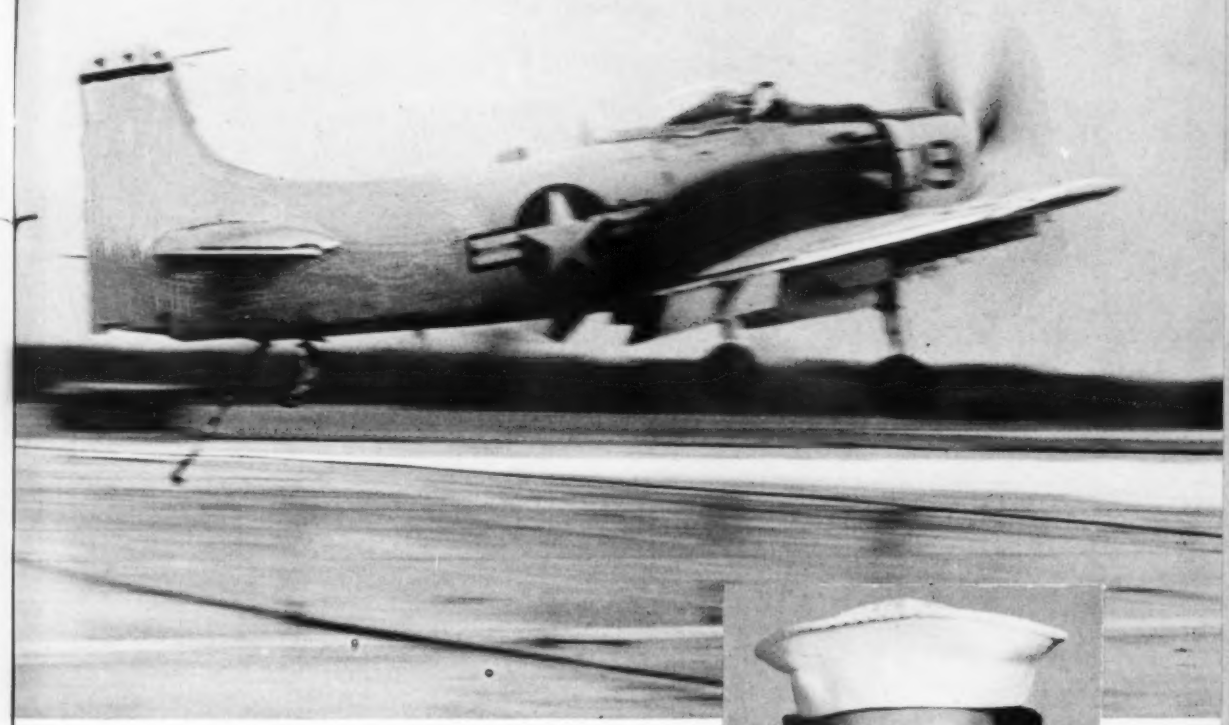
There Are No Short Cuts To Safety

THIS is the vital point safety men in the airlines must convey to all employees. By nature of our business being extremely safety conscious, we spend considerable money establishing procedures and providing manuals outlining the safe way to get a job done. Despite our efforts, accidents do happen, and they are always costly.

In a careful analysis of our accidents, we have discovered that one of the predominant causes is deviation from established procedures. There is no easy explanation of this, but it has given us a point from which to work if we are to reduce the accident menace. First, throughout our training programs extra emphasis is placed on the necessity of following established, proven procedures. And second, we have taken time to observe the man perform on the job. In a considerable number of cases, we have found that "deviation," which often leads to accidents, is brought on by a desire to take short cuts.

We know that eliminating the tendency to take short cuts will be a continuous job requiring close supervision. When we have impressed upon our employees that strict adherence to established procedures is important to the individual and the company, our safety program will have taken one of its most vital steps forward.—*National Safety Council Air Transport Newsletter* ●

Well Done!



Terrence C. Humphrey, ACT2, USNR-R, of NAS Seattle—While on duty as A-stand controller in the NAS Seattle tower, Humphrey observed an AD just becoming airborne and aborting its takeoff due to a rough running engine.

Upon noting the aircraft's difficulty, Humphrey quickly transmitted to the pilot, "you have a tailhook and the arresting gear is just ahead of you . . . "

The pilot quickly responded by dropping his hook and a normal arrestment was made with no damage.

For his quick thinking and positive action which contributed to a safe arrestment, Humphrey was commended by his commanding officer.

To Terrence C. Humphrey, who symbolizes the quick, alert performance that is ever needed on the ground as well as in the air, APPROACH extends a hearty Well Done!

Terrence C. Humphrey, ACT2